THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY;

A BRITISH AND FOREIGN MISCELLANY

OF

SCIENCE, INVENTIONS,

MANUFACTURES, AND ARTS.

VOLUME IV.

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No. 75.] SATURDAY, JANUARY 2, 1841. [PRICE FIVEPENCE STAMPED. CIRCULATING FREE BY POST.

ACTION AND RE-ACTION.

It is one of the first precepts of mechanical science that "action and re-action are equal, and in opposite directions." Though this truth is recognised by all who have made the least advances in mechanical knowledge, yet it is in practice constantly neglected and overlooked. Had attention been paid to this fact, most of the foolish attempts to invent a perpetual motion would not have seen the light, for they depended on the opinion, that power may be generated by motion; and, on omitting to consider that if motion be communicated there must be a corresponding re-action, whether perceptible or not. The idea that by communicating rotary motion to bodies, a quantity of power can be generated, to which the name of "centrifugal force" is given, also originated from the imperfect knowledge generally entertained respecting the nature of action and re-action. When one solid body acts upon another solid body, there is, indeed, not much room to doubt the effect of re-action; but where either the one or the other, or both bodies, are not solid, or when the direction and nature of the action is complex, the re-action becomes more difficult to appreciate and determine.

When the floats of a paddle-wheel strike the water, the re-action of the fluid against the float-boards gives the impulsive force to the boat. The motion in this case depends as much on re-action as when the vessel is propelled by pushing it from the shore with a boat-hook, though the effect is not so apparent. This is, however, so strictly the case, that the whole impulsive power must necessarily be limited to the amount of re-acting force that can be exerted by the quantity of water against which the floats act. If the float-boards be raised partly out of the water, the resistance, or re-action, of the fluid to the action of the revolving floats would be diminished in proportion to the decrease of the quantity, and consequently the weight of the resisting fluid. A given quantity of fluid can, therefore, only offer a given amount of resistance, and when the motion of the paddles is so rapid as to equal by the force of their action the total amount of re-acting force which the quantity of water they displace is capable of exerting, no additional velocity of the wheels can increase the impulsive power.

If the re-action of water be more difficult to comprehend than that of solid bodies, the difficulty is still further increased when the action and re-action of steam and gases are to be taken into consideration. Steam of two atmospheres of pressure exerts an expansive force of 30 lbs. to the square inch on every part of the boiler. Each portion of the boiler, in the same manner, re-acts on the steam, and a perfect balance is maintained between their reciprocal actions, so long as the boiler continues to resist the pressure. If a tube, closed at one end, were inserted into the boiler, the pressure of the steam on the area of the tube, would tend to blow it out with the degree of force that the steam exerts on the same area of any portion of the boiler. Suppose the tube to present an area of a square inch: the power required to keep it in the boiler would then be equal to 30 lbs. If the closed end of the tube, which re-acts on the steam, were opened, and the steam allowed to escape freely through it, scarcely any power would be required to keep the tube in the boiler. The re-action would be removed from the tube, and the only direct action of the steam would be occasioned by its rubbing, or friction, against the inequalities of the inside of the tube. The steam would, under these circumstances, rush out, and it might be supposed that there is no re-action, since the bottom of the tube has been removed, and the tube itself is retained in its place in the boiler with very small exertion of force. The re-action, however, continues under these circumstances as strongly as before, but it is transferred from the bottom of the tube to the surrounding air. The air being a yielding elastic body gives way to the force of the effluent steam, as a spring would do, but, like a spring also, it re-acts to the same degree that it is acted on. If the steam were to escape into a vacuum it would rush out with much greater velocity than when escaping into the air; and if the air were compressed to the same degree as the expansive force of the steam, there would be no escape of steam whatever. When steam escapes into the atmosphere, the re-action occurs from a large expanse of air compared with the aperture from which it issues, but it is not the less a re-acting force because it is spread over a larger space. The amount of the total re-action of the air on the inside the boiler, is in fact equal to the pressure or impulse of the steam on the air.

We thus perceive, that the efflux of all fluids must be regulated by the re-acting force of the medium into which they issue. It has been usual to consider the motion of fluids through apertures as depending solely on their height and consequent pressure; but it is evident, that the density of the medium into which they flow, and the re-action, or resistance, that thus ensues, should be taken into account, as it forms one of the leading elements in the calculation. A very simple illustration of the re-action of the air on spouting fluids, is obtained by suspending by a string a small vessel, with a hole in the side, near the bottom. When the vessel is filled with water, the fluid spouting through the hole, will cause the air to re-act, and force the vessel out of the perpendicular in which it previously hung.

It is sometimes erroneously supposed, that re-action is prevented by the motion of the body on which the direct action takes effect. It must have been an erroneous notion of this kind that induced the inventor of the boat fitted with horizontal vanes turning paddle-wheels, which we lately noticed,* to conceive that by the action of the wind on the vanes the paddles would work the vessel against the wind. The resistance which the revolving vanes would present to the action of the wind would, however, be nearly the same as if they were stationary, and the wind would have equal effect in propelling the boat in the direction it was blowing. All similar attempts to cause a moving power to act against, and overcome itself, are founded on the same erroneous idea respecting the nature of re-action.

THE THEORY OF VISION.

We mentioned last week that among the papers read at the meeting of the French Academy of Sciences on the 14th ult., was one by M. Vallée on the theory of vision. The following is a more extended notice of the memoir, and of the discussions which took place on the subject among the members of the Academy.

In the present state of the sciences, philosophers have succeeded in giving a satisfactory explanation of the general conditions on which the sight depends, and we willingly admit with them that the convexity of the cornea, the form of the crystalline, and other humors of the eye, are destined to concentrate the rays of light on the retina, there to paint perfectly distinct images; but when we ask for a strict explanation of these facts, they are forced to avow the insufficiency of their theory in determining the method in which this phenomenon

* Inventors' Advocate, No. 63.

is accomplished, and the part sustained by the several elements of the organ. Experiments have been undertaken in Germany for the purpose of introducing into this branch of the sciences improvements, which interest both physics and physiology. Several endeavors have been made to determine the indices of refraction, and the curvatures of the different media traversed by the rays of light; but whatever confidence we may have in the authors of these researches, we cannot accept their results before subjecting them to very severe proofs. For the organs, deprived of life and detached from their orbit, on which they operated, may with great probability have afforded different results to those which correspond to the normal state. And even were the exactitude of these results perfectly recognised, it would still be lawful to doubt whether every element of the problem had been included, and whether some organic circumstances had been omitted, the action of which was indispensable.

The method adapted by M. Vallée to throw a light on this delicate question is as follows:—He admits the experimental data, which he desires to rectify, and applying to them the ordinary calculations, he seeks the place where the image of certain luminous points, placed at different distances from the eye, would be formed. The result of these calculations is that the image would be formed at a perceptible distance beyond the retina, at whatever distance the focus is placed. Correcting, then, the data, M. Vallée recommences his calculations, and finds, notwithstanding the exaggerated hypotheses he had made, that the focal distance is still not sufficiently shortened. He then draws the legitimate conclusion from this, as it were, *reductio ad absurdum*, that the most careful experiments yet made on the constitution of the eye are incapable of explaining the phenomenon of vision, and that the problem must be subjected to a more exact analysis. This result is purely a negative one, and leaves a great deal of obscurity on the error which it was intended to rectify; but it is not the less important, as preparing the road to a definitive solution. Of this opinion were the committee charged with examining this paper, and they proposed its insertion among the collection of foreign scientific communications.

These conclusions gave rise to some remarks on the part of M. Biot, who said that the experimental data were not sufficiently serious to deserve a verification of this kind, and that it appeared futile to subject to a long calculation numbers the accuracy of which might have been contested from the very commencement. These observations were not sufficient to prevent the majority from voting for the insertion of the memoir among the collection of foreign scientific communications.

During the discussion M. Arago stated, with great decision, that the eye is not an achromatic instrument. When we apply the most accurately constructed prism to a good telescope, we transform the stars, by this means, to elongated spectrums painted with the colors of the rainbow. According to M. Arago, we never clearly see all the colors of the stars at once. The point necessary for the proper concentration of one of the colors necessarily expands and weakens all the others. This curious experiment appears, indeed, to demonstrate that the eye is not achromatic. It is, however, sufficiently so for the common purposes of life, and it cannot be denied that substances such as snow and swan's down appear purely white to the eye in a healthy state.

SULPHUR MINES IN AFRICA.

Letters from Tripoli give some interesting particulars of an attempt lately made by a French company to work the sulphur mines in the Gulf of Syrte. It seems that a French chemist, named Subtil, residing at Tripoli, having accidentally seen some specimens of sulphur of remarkable purity, which he ascertained to have been brought from the interior, determined to visit the place of its production. After a search for forty days, traversing the Desert of Barca, and arriving quite at the bottom of the Gulph of Syrte, he found mountains of sulphur mineral, and a lake whose bottom and sides were sulphurous earth. The mineral of the rock sulphur is extremely abundant, quite on the surface, and many camels were speedily loaded with samples. The district was nominally within the pachalic of Tripoli, but had for some time been absolutely ruled by Abdel, a Moorish chieftan of illustrious birth, who maintained an army of forty or fifty thousand men, and enjoyed a virtual sway over a very extensive portion of this part of the African continent. From this chieftain, M. Subtil obtained the exclusive right of working the mines in question for a certain number of years; and, on the strength of the contract, he returned to France, and obtained the support of some of the first merchants at Marseilles to the prosecution of his plan. In May he landed in Africa, with a number of workmen, and amply provided with the means of turning the mines to the best account. But in the interval the aspect of affairs had changed. The Moorish chieftain had been defeated by the troops of Tripoli, and the district had returned to its allegiance. The British Government had protested against the contract with Abdel as a monopoly, and therefore a breach of their treaty with Turkey, and all the exertions of M. Subtil to obtain a confirmation of his contract were fruitless. He was, however, a man of too much spirit to abandon his enterprise without a struggle, and accordingly, having abandoned his monopoly, he is negotiating with the Turkish Government for permission to work the mines, in the hope of realising a handsome remuneration for his outlay before he could be disturbed by the competition of any other adventurers. The sulphur district lies between the ports of Tripoli and Bengazi. The rock ore has been found to give 35-40 per cent. of pure sulphur, and also 2-15 of sulphate of soda, and 5-10 per cent. of salt. The sulphurous earth gave 45-50 per cent. of pure sulphur, but was of a more difficult fusion. European produce in the interior of Africa bears a profit of 700 per cent., and gold dust sells there for only one dollar the meteral, or 373 English grains, and indeed all the interior produce is at a similarly low rate.

TRANSMISSION OF SOUND.

(*From Mr. Webster, " On the Principles of Sound."*)

Of the transmission of sound through air, numerous experiments have been made at various periods, in different countries; but differences of temperature, as well as the insufficiency of the instruments employed, have rendered the results by no means uniform, as the following estimates, principally collected by Sir J. F. W. Herschel, evince:—

	Feet per Second.
Mersennes, Balistics	1474
Walker, Philos. Trans.	1305
Roberts, do. do	1300
Boyle, on Motion	1200
Cassini and others, Duhamel	1172
Florentine Academicians (1660)	1148
Flamsteed, Halley, Derham (which, at 77½ degrees Fahrenheit, is correct)	1142
G. E. Muller	1109
Parry, Philos. Trans., 1828	1038
Arago, Matthieu, Humboldt and others, 1822	1086
Moll, Vanbeek, and Kytenbrouwer, in Holland	1089
Gregory, Dr. Olinthus, at Woolwich (1823)	1088

The three latter experiments appear to be nearly coincident, and were made in dry air, at the temperature of 32 degrees; those by the French philosophers, by the aid of a watch which made one revolution in a second, and was provided with an apparatus supplied with printer's ink, which, by means of a lever, dotted the dial at the precise portion of a second when the flash was observed. The experiments by the Dutch were regulated by a clock of such extreme delicacy of construction as to register the hundredth part of a second. The velocity of sound may therefore be determinately fixed at the average these experiments produce, of 1,090 feet in a second, at the temperature of 32 degrees of Fahrenheit; and every additional degree of temperature adds 1·14 foot to the velocity. At 62 degrees, it passes at the rate of 1,125 in a second: and these being determinate points, it will be perceived that, in 30 degrees increase of temperature, the velocity of sound is extended 35 feet, or 1·17 of a foot for each degree, which, though not mathematically correct, is sufficiently near, and more convenient for common calculation, a like allowance being made for the retardation of sound at every degree below the freezing point. Sound thus passes, at the temperature of 62 degrees, 9,000 feet in eight seconds, equal to 12¾ British standard miles in a minute, or 765 miles in an hour, which is about three-fourths of the diurnal velocity of the earth's equator. These calculations, however, represent the velocity of sound in open air; its rapidity, superficially, is considerably greater, but has not yet been subjected to accurate investigation.

Of the transmission of sound through liquids, the experiments of M. Perrole appear to be the most correct. The following is the mode by which they were effected:—

"I closed all the joints of my watch with soft wax, and then suspended it by a silk thread. In this state I hung it by an iron branch fixed in the wall, so that the watch remained suspended in the middle of a glass vessel, five inches in diameter and seven inches high, taking care that neither the watch nor the thread touched the vessel in any part. I remarked the kind of sound afforded by the watch, and the distance at which I ceased to hear it. After having marked this point, I then filled the vessel with water, into which I again suffered the watch to descend, with the same precaution of not letting it or the thread touch the vessel.

"The tone (*timbre*) was changed in the water in a striking manner. The sound was propagated in so lively a manner that the glass and a small table of wood on which it stood at a distance from the wall, seemed to undergo direct percussion as from a solid body. But what appeared still more astonishing was, that in the midst of all these agitations the fluid in which the watch was plunged was perfectly tranquil, and its surface not in the slightest degree agitated.

"By substituting different liquids in the place of water, I had results in general analogous to those I had obtained with that fluid; but each medium gave a different modification to the sound, of which the intensity was noted as follows:—

"*Intensity of Sound observed in the different Fluids.*

	Feet.
1. In the air, serving as the term of comparison, it ceases to be heard at the distance of	8
2. In the water, at that of	20
3. Oil olive	16
4. Oil of turpentine	14
5. Spirit of wine	21

"It is proper to observe, that on repeating these trials I observed some variations in the intensity, which appeared to depend on the organ of sense or accidental noises."

From the experiments made upon liquids it follows:—

"1. That these, as well as solids, do transmit sounds much better than air, and that even the fat oils are not to be excepted.

"2. That each fluid upon trial is found to modify the sound in a peculiar manner.

"3. Philosophers maintain the opinion that sound is propagated in the air by means of certain motions or undulations, which the transparency of that fluid prevents our seeing. My experiments with fluids, which do not elude the sight, and in which no motion was perceived, notwithstanding the very effectual transmission of sound, may render this in some respects doubtful."

These experiments, it will be observed, exhibit the intensity of sound after passing through liquids, and subsequently distinguished in the air; but the

transmission of sound through water, and heard in the water itself, is more rapid, and may be heard at a greater distance than any calculations have hitherto ascertained. Dr. Franklin, having plunged his head under water, heard distinctly the striking of two stones at the distance of half a mile; and Dr. Monro ascertained that its velocity below the surface was about four times greater than in the open air. The experiments made by Calladon in the lake of Geneva, in the year 1826, though they merely confirmed the calculations of Monro, were so ingenious and complete, as to set the matter at rest, and render any further experiments unnecessary. Having discovered that a bell was the most effective mode of propagating sound under water, he contrived that the same lever which struck the bell should also ignite gunpowder, so that the precise moment might be denoted. Having marked out a distance of nine miles upon the lake, he caused a thin cylinder of tin, about nine feet long and eight inches in diameter, closed at the downward end, to be inserted in the water, leaving but a small portion above the surface. From the result of 44 experiments made on three different days, he ascertained that the velocity of sound was 4,708 feet in a second, the water being of the temperature of 46 degrees. As sound, at the same temperature, would pass at the rate of 1,106 feet in the air, its velocity in water is four times greater, with a surplus of 284 feet. Some interesting experiments may still be made upon this principle, and it is highly probable that if the tube were increased in length, and made the shape of an ear trumpet, some of the enormous charges of gunpowder, exceeding 2,000 lbs. weight, which have been employed for the domolition of vessels under water, might be heard across the British channel.

Sound, created in the open air, is heard, though but faintly, under water, and sound made in water is as feebly distinguished in the air; that of the bell used by M. Calladon not having been heard at the distance of 300 feet by persons upon the surface. Colonel Pasley has informed me, as the result of some of his experiments, "that a ton of gunpowder fired at Spithead, at the depth of about 14 or 15 fathoms, makes a report not exceeding that of a 24 pounder at a moderate distance."

To account for this difference in the intensity of sound by those diverse modes of propagation, it is submitted whether the particles of water may not assume a flattened shape, and be distributed in a laminated form, and thus transmit sound in a horizontal direction with more force than vertically or upward. This hypothesis, which is only suggested, has some analogy in the transmissible qualities of wood, which conveys sound longitudinally, or in the direction of its growth, with great rapidity, while it is not transmitted so sensibly by the continuity of transverse planks or sections.

The different degrees in which substances derived from the mineral, vegetable, and animal kingdoms are favorable to the transmission of sound, appear to be regulated by laws not easily demonstrable.

In the mineral kingdom, those which are most loosely combined appear to possess this quality in the smallest degree, which increases with their augmented hardness; thus, vegetable earth, sand, pumice-stone, marble, limestone, and flint are graduated in this scale. Clay is insonorous from the quantity of water it contains, but when formed into tiles, bricks, and pottery, and baked, the water becomes evaporated, and air chambers are formed, and it is then highly sonorous.

In metals, which in this inquiry we must separate from minerals, their efficacy in producing sound appears to depend upon their lightness and brittleness. Glass, which from its artificial composition may for the purpose of this inquiry be considered as a metal, exhibits the greatest susceptibility, as it does not require the contact of other tangible bodies to elicit sound from it, but becomes sonorous from sound already existing. A person sneezing loudly in a room in which a tumbler is placed on a table, will cause it to ring; a violoncello played near a table containing glasses, will cause them to fall off (Arnott); and a violin played in proximity to a piece of glass covered evenly with sand, will cause such changes of its surface, by the expansion of the aerial particles within it, as, on the subsidence of sound, to leave geometrical figures indicative of the valleys and elevations into which it had been thrown.

Bell-metal is a composition of zinc and tin, two of the lightest and least ductile metals, rendered by their amalgamation still more brittle, and containing a larger proportion of internal cavities; thus affording the best medium for sound. Brass, which is a combination of zinc and copper, possesses the sonorous property in the next greatest degree; while in the unalloyed metals it declines from iron, silver, copper, gold, and tin, to lead; its declination appearing to be produced by their increased softness.

The dried fibres and skins of animals, from which violin-strings and drum-heads are constructed, possess this quality in a still greater degree; and the sound which they produce arises entirely from the constrictile power of their filaments upon the air interspersed within them, as in the case of metals, and in no degree from their vibration, if by that term is meant their action upon the external air; as, after wetting them, nearly the same degree of motion may be produced, but the constrictile power being destroyed, they no longer generate sound.

There is a tendency in the arrangement of the molecular aggregations of both animal and vegetable matter, which renders them more favorable for the propulsion of sound in particular directions. The suitableness of wood for masts is ascertained in the dock-yards by placing a watch at one end of tho spar and the ear at the other: if the sound be heard in a harmonious manner, well known to experimenters, the timber is deemed sound; but if any horizontal crack exist, its unfitness is detected. The cause of this effect in all substances, whether stone, wood, or metal, may be easily understood. In their perfect state all possess a homogeneity or graduated admixture of their solid, aqueous, and aerial particles; and if these are dissevered by a crack, continuity of the internal vibrations is interrupted, the chasm admitting an expansion of the air, and losing a degree of compressibility which cannot afterwards be regained.

The following calculations are the result of experiments, made by different persons, of the velocity of sound, through various substances; but, not having been effected with the same accuracy as those through air and water, they are not equally to be depended upon:—

	Feet per Second.
In Tin	7,800
Silver	9,300
Brass	11,800
Copper	12,500
Iron	17,500
Tobacco-pipes	10 to 12,000
Wood (various)	11 to 18,000
Fir-wood	17,300
Glass	17,500
Crown-glass	17,700

MINERAL PRODUCTS OF IRELAND.

(From the Mining Journal.)

A hurried visit to Ireland has enabled us to gather some pleasing information of the progressive advancement of mining operations, and the success which has attended the working of mines in that country. In the county of Wicklow much activity prevails—measures being adopted for increasing the supply of the sulphur ores of that district, of which we learn some large sales have been effected in Liverpool at 30s. to 31s. per ton, which is, however, under the regular quoted price, while the quantity calculated to be raised from the mines at present in course of working may be estimated at from 5,000 to 5,500 tons a month. We have already observed upon the cost of carriage of this article, which, from some of the mines, cannot be set down at the present moment at less than 6s. 6d. per ton to the port, with freight of 7s. per ton, being alone £45,000 per annum; the cost of the ore delivered to the consumer being taken at £105,000, or 32s. a ton. This, which is so heavy a charge on the article, is, we are glad to say, about being reduced, whereby tho miner and the manufacturer must benefit, it being in contemplation to construct a railway from the mines to the port of Wicklow or Arklow, but to which port has not yet been determined, as much will depend on circumstances; in the mean time, however, it is satisfactory to learn that instructions have been given for levels being taken and the ground marked out. The saving thus effected, it will at once be seen, would form a very considerable item, and which, on 65,000 tons annually, might be fairly calculated as being equal to £12,500 per annum—giving to the railway proprictors a handsome return for the employment of their money. Having had an opportunity of passing over a part of the proposed line, we have no hesitation in saying, that it may be constructed for a comparatively trifling sum. Several properties, we find, have lately been secured in this district, and active measures taken for working them on an extensive scale.

It is highly gratifying thus to be able to report on the mineral products of the Sister Isle, with reference to this particular district, and which is considerably enhanced by the fact, that the profits of the Mining Company of Ireland, for the past six months, exceeds £15,000, from which a dividend will be declared at the forthcoming general meeting of the proprietors, to be held in about a fortnight. The copper mine of Knockmahon continues to yield a considerable profit; and the collieries worked by the company have also been attended with successful results—the slate quarries, which promise well, having, we understand, passed over to another company. At Allihies the ores continue to maintain their high produce, and the proprietors have no reason to complain of diminution of profits. The collieries in the Queen's County are likely this winter to raise a considerable quantity of coal, which obtains at the pit's mouth a price ranging from 16s. 8d. to £1 per ton. In Antrim we are also informed that the collieries at Ballycastle are about being resumod with spirit; and it is rumoured that the marble quarries in Connemara are likely to be worked. The marble quarries near Galway are, we learn, being worked to advantage—Mr. Franklin, the proprietor, having, within the past three months, shipped upwards of 500 tons, representing 6,000 cubic feet; railways are here being laid down, and extensive machinery, to be worked by water power, is in course of erection; several properties also, which have hitherto been neglected, are now anxiously sought after—and, indeed, it would appear that parties are determined to adopt the "go ahead" principle, as regards the mines of Ireland. The quantities of copper and sulpbur ores sold during the present year—to which should be added the producc ot the lead mines, collieries, and quarries—are as follow:—

	Tons.	Amount.		
Knockmahon	7,875	£62,987	1	0
Allihies	4,808	40,980	12	6
Wicklow district	6,646	21,432	3	6
Lackamore	510	4,336	11	0
Kenmare	77	1,132	13	6
	19,916	£130,869	1	6
Sulphur ores, Co, Wicklow, about	32,000	50,000	0	0
	51,916	£180,869	1	6

SUPPLY OF LONDON WITH WATER.

A new company is in progress of formation, to be entitled "The London and Westminster Water Company," for the purpose of supplying parts of the metropolis with water of a purer kind than is now supplied from the contaminated sources whence most of the water is drawn. The new company propose to draw their supply from Bushey Hall meadows, near Watford. A report has been made by Mr. Robert Stephenson of the quantity of water that may be obtained from wells sunk there, in the vicinity of the river Colne, where it appears, from

Mr. Stephenson's calculations, a supply may be derived equal to 42 millions of gallons in the twenty four hours. The water is represented to be of the finest quality, and so beautifully transparent that the bottom of the well can be seen when the water is thirty feet deep. The following extract from Mr. Stephenson's report will show the grounds on which he founds his calculation of the supply.

"The surface of country which has its drainage into the Verulam and Colne above Watford, may be taken at $113\frac{1}{2}$ square miles. If, then, we assume that the annual fall of rain amounts to twenty inches, which you will find a low average, the result will be $14\frac{1}{2}$ millions of cubic feet of water per twenty-four hours falling on the surface. Of this quantity, Mr. Telford found that the Colne carried off at Watford thirty cubic feet per second, or about $2\frac{1}{2}$ millions per twenty-four hours; as this was however in a dry season it will be safer to assume Dr. Thompson's calculations, with respect to the annual quantity of water flowing off by streams and springs, which he was led to fix at four inches, and this would give us for the area drained by the Colne, not quite 3 millions per day. There remain then $11\frac{1}{2}$ millions of cubic feet per twenty-four hours, either to be again evaporated, or to find their way into the earth. If we assume that with the portion which enters into animal and vegetable life, one-third of the entire quantity falling disappears in this manner, we still shall have upwards of $6\frac{1}{2}$ millions of cubic feet, or 42 millions of gallons per twenty-four hours, supplying the sheet of water under that portion of the chalk surface.

"Mr. Telford's examination of the body of water flowing off by the Colne river, having been made at a period of unusual drought, when the surface water might be considered to have nearly disappeared, we shall, I think, be correct in assuming that two mlilions at least of the quantity he measured, had issued from springs. In order therefore to represent the total subterranean flow, we should add these 2 millions to the former $6\frac{1}{2}$. These indeed would form no part of the supply to the deep, but would designate that supply which cannot find its way to the lower depths, owing to friction, and other impediments, and therefore seeks a readier vent at a higher level.

"It was important that this should be set in its proper light, as the evident inference we may draw is, that we cannot, by pumping from a lower level a quantity small in comparison to the accumulation of water, produce any visible effect upon the springs which feed the Colne.

"The alluvial bed which covers the bottom of the Colne valley rather exceeds twenty feet in thickness, after which we reach the chalk; proceeding about five feet lower, abundant springs of water are encountered, which increase in magnitude and force as we continue to descend.

"It was therefore in the first place necessary to ascertain that these did not derive their supply directly from the river, which, had it been the case would have effected the various mills in the vicinity; and it was also desirable to have direct proof of the quantity which might be calculated on being obtained. In order to obtain positive evidence on both these points, a well was sunk in Bushey Hall meadows, near the Colne, to a depth of about 34 feet. Two small steam-engines were then set up temporarily for the purpose of working four pumps, of which two were 13 inches in diameter, with a length of stroke of 20 inches, and the others were $13\frac{1}{8}$ inches in diameter, with a 36 inch stroke. One of the engines might be calculated to produce from 27 to 30 strokes of the smaller pumps per minute, the other between 17 and 20 strokes of the larger pumps. The water of the well was now repeatedly pumped out as low as the power of the engines admitted, and the height of the Colne at those times carefully noted, and it soon became obvious that the height of the springs could in no degree be said to affect the level of the river, thus showing that all direct communication between the two might be considered as cut off by a bed of puddle or clay. The next object of inquiry was as to the supply which a well might be expected to yield, and the result of a careful experiment, made under my direction, and confirming those previously conducted by Mr. Paten, satisfied me that after the water had for twenty-four hours been kept at the lowest level to which the power of the pumps would reduce it, (about twenty-six feet below its surface when undisturbed,) it rose in the well with a velocity equal to 2·02 feet per second, thus yielding 174,500 cubic feet, or 1,091,000 gallons per twenty-four hours. As this was obtained in a well, the bottom of which was only 12 feet 6 inches diameter, and as direct proof had been obtained by borings, that below the 34 feet reached in the well, there was a constant recurrence of large springs, giving evidence that the water rapidly increased with the depth, which when 80 feet were obtained became so prodigiously plentiful as to set all temporary means of overcoming it at defiance, and precluded all possibility of having recourse to it for the mere purposes of an experiment, I thought it quite unnecessary to seek further proof that a sufficient supply for all requisite purposes might with facility be obtained."

PATENTS.—BRITISH AND FOREIGN.

MONTHLY LIST OF NEW PATENTS.

Miles Berry, of Chancery-lane, patent agent, for *certain improvements in looms for weaving.*—6 months, Nov. 27.

John Clay, of Cottingham, York, gentleman, and Frederick Rosenborg, of Sculcoates, in the same county, gentleman, for *improvements in arranging and setting up types for printing.*—6 months, Nov. 27.

John Condie, manager of the Blair Iron Works, Ayr, Scotland, for *improvements in applying springs to locomotive railway and other carriages.*—6 months, Nov. 27.

George Holworthy Palmer, of Surrey-square, civil engineer, and Charles Perkins, of Mark-lane, merchant, for *improved constructions of pistons and valves for retaining and discharging liquids, gases, and steam.*—6 months, Nov. 28.

George Blaxland, of Greenwich, engineer, for *an improved mode of propelling ships and vessels at sea and in navigable waters.*—6 months, Nov. 28.

Henry Bridge Cowell, of Lower-street, Saint Mary, Islington, ironmonger, for *improvements in taps to be used for or in the manner of stopcocks, for the purpose of drawing off and stopping the flow of fluids.*—6 months, Dec. 2.

James Robinson, of the Old Jury, manufacturer of machinery, for *a sugar-cane mill of a new construction, and certain improvements applicable to sugar-cane mills generally, and certain improvements in apparatus for making sugar.*—6 months, Dec. 2.

Alexander Horatio Simpson, of New Palace-yard, Westminster, gentleman, for *an improved machine or apparatus for working pumps.*—6 months, being a communication, Dec. 9.

William Peirce, of George-street, Adelphi, gentleman, for *improovements in the preparation of wool, both in the raw and manufactured state, by means of which the quality will be considerably improved.*—6 months, Dec. 9.

Charles Winterton Baylis, of Birmingham, accounting-house clerk, for *an improved metallic pen, to be called the patent flexion pen, and improved penholder.*—6 months, Dec. 16.

George Wildes, of the city of London, merchant, for *improvements in the manufacture of white lead.*—6 months, being a communication, Dec. 16.

James Davis, of Shoreditch, engineer, for *an improved mode of applying heat to certain steam-boilers.*—6 months, Dec. 16.

John Steward, of Wolverhampton, esq., for *an improvement in the construction of pianofortes, harpsichords, and other similar stringed musical instruments.*—Dec. 16.

James Molyneux, of Preston, for *an improved mode of dressing flax and tow.*—6 months, Dec. 16.

Charles Botton, of Farringdon-street, gas engineer, for *a certain improvement in gas meters.*—6 months, Dec. 16.

Hugh Graham, of Bridport-place, Hoxton, artisan, for *a new mode of preparing designs and dyeing the materials to be used in the weaving and manufacture of Kidderminster carpets, and for producing patterns thereon, in a manner not before used or applied in the process of weaving and manufacturing such carpets.*—6 months, Dec. 16.

Joseph Beathic, of Portland-place, Wandsworth-road, Lambeth, engineer, for *certain improvements in locomotive engines, and in carriages, chairs, and wheels, for use upon railways, and certain machinery for use in the construction of parts of such inventions.*—6 months, Dec. 16.

Andrew Pruss D'Olszowski, of Ashley-crescent, gentleman, for *a new and improved level for ascertaining the horizon, and the several degrees of inclination.*—6 months, being a communication, Dec. 16.

William Tudor Mabley, of Wellington-street North, mechanical draftsman, for *certain improvements in producing surfaces to be used for printing, embossing, or impressing.*—6 months, Dec. 17.

Abraham Alexander Lindo, of Finsbury-circus, gentleman, for *improvements to be applied to railways and carriages thereon, to prevent accidents, and to lessen the injurious effects of accidents to passengers, goods, and railway trains.*—6 months, Dec. 18.

Elias Robison Hancock, of Birmingham, esq., for *certain improvements in mechanism applicable to turn-tables, for changing the position of carriages upon railroads, for furniture and other purposes.*—6 months, Dec. 18.

Richard Coles, of Southampton, slate merchant, for *improvements in machinery for manufacturing tanks and other vessels of slate, stone, marble, and other materials, and in fitting and fastening such materials together.*—6 months, Dec. 23.

Benjamin Baillie, of Henry-street, Middlesex, for *improvements in locks, and the fixings and fastenings thereto belonging.*—6 months, Dec. 23.

John Brumerell Gregson, of Newcastle-upon-Tyne, Northumberland, soda-water manufacturer, for *improvements in pigments, and in the preparation of the sulphates of iron and magnesia.*—6 months, Dec. 23.

Frederick Payne Mackelsan, of Birmingham, and James Murdoch, of Hackney-road, civil engineers, for *certain improvements of or belonging to tables, a portion of which is applicable to other articles of furniture.*—6 months, being partly a communication, Dec. 23.

George Thornton, of Brighton, civil engineer, for *certain improvements applicable to railways, locomotive engines, and carriages.*—6 months, Dec. 23.

John Dickinson, of Bedford-row, esq., for *certain improvements in the manufacture of paper.*—6 months, Dec. 23.

David Walther, of Angel-court, Throgmorton-street, merchant, for *certain improvements in the methods of purifying vegetable and animal oils, fats, and tallows, in order to render those substances more suitable ta soap-making, or for burning in lamps, or for other useful purposes; part of which improvements are also applicable to the purifying of the mineral oil or spirit, commonly called petroleum or naptha, or coal oil, or spirit of coal tar.*—6 months, Dec. 23.

John Jones, of Leeds, brush manufacturer, for *improvements in carding engines for carding wool and other fibrous substances.*—6 months, being a communication, Dec. 23.

Joseph Barker, of Regent street, artist, for *improvements in gas meters.*—6 months, Dec. 23.

John Buchanan, of the city of Glasgow, Scotland, builder, for *certain improvements in wheel carriages, whether for common roads or railways.*—6 months, Dec. 28.

William Bridges Adams, of Porchester-terrace, Middlesex, gent., for *certain improvements in the construction of wheel carriages, and of certain appendages thereto.*—6 months, Dec. 28.

John Wells, of Ely-place, Hammersmith, in the county of Middlesex, gent., for *certain improvements in the manufacture of coke.*—6 months, Dec. 30.

William Henry Kempton, of the City-road, in the county of Middlesex, gent., for *improvements in cylinders to be used for printing calicoes and other fabrics.*—6 months, Dec. 30.

Henry Adcock, of Winstanley, near Wigan, in the county of Lancaster, civil engineer, for *improvements in the means or apparatus for condensing, concentrating, and evaporating aeriform and other fluids.*—6 months, Dec. 30.

Francis Burdett Whitaker, of Royton, Lancaster, cotton-spinner, for *certain improvements in the machinery or apparatus for drawing cotton and other fibrous substances, which improvements are also applicable to warping and dressing yarns of the same.*—6 months, Dec. 31.

Joseph Stubbs, of Warrington, county of Lancaster, file manufacturer, for *certain improvements in the construction of screws, wrenches, and spanners, for screwing and unscrewing nuts and bolts.*—6 months, Dec. 31.

Thomas Robert Sewell, of Carrington, county of Nottingham, lace manufacturer, for *certain improvements in obtaining carbonic acid from certain mineral substances.*—6 months, Dec. 31.

William Henry Kempton, of Pentonville, Middlesex, gent., for *improvements in lamps.*—6 months, Dec. 31.

John Grylls, of Portsea, for *improvements in machinery used for raising and lowering weights.*—6 months, Dec. 31.

Joseph Haley, of Manchester, engineer, for *an improved lifting jack for raising or removing heavy bodies, which is also applicable to the packing or compressing of woods or other substances.*—6 months, Dec. 31.

William Newton, of Chancery-lane, civil engineer, for *certain improvements in the rigging of ships and other navigable vessels.*—6 months, Dec. 31.

Henry Scott, of Bronlow-street, Bedford-row, Middlesex, surgeon, for *improvements in the manufacture of ink or writing fluids.*—6 months, Dec. 31.

William Hensman, of Woburn, in the county of Bedford, machinist, *for improvements in ploughs.*—6 months, Dec. 31.

Joseph Parkes, of Birmingham, button manufacturer, for *improvements in the manufacture of covered buttons.*—6 months, Dec. 31.

Louis Holbeck, of Hammersmith, in the county of Middlesex, gent., for *improvements in obtaining or producing oil.*—6 months, being a communication, Dec. 31.

ENGLISH EXPIRED PATENTS.

Elijah Galloway, of the London-road, engineer, for *an improved rotary steam-engine*, Dec. 29.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ROLLS CHAPEL OFFICE.

(*Continued from page* 372.)

William Harry Smith, of York-road, Lambeth, civil engineer, *improvements in the mode of resisting shocks to railway carriages and frames, and also in the mode of connecting and disconnecting railway carriages, and in the application of springs to carriages*, Nov. 20.—Claim first.—An increased length of action in, and a consolidation of the power of the elastic resisting medium.

Claim second.—The several apparatus described for effecting the same.

Claim third.—A solid connector, combining a more ready attachment with the power of instant detachment.

Claim fourth.—An improved application of vertical or side springs, so as to secure to the carriage a universal elastic support.

An elastic medium is placed underneath one of the carriages against which the buffing bar acts when it has received a shock; a set of springs are placed under the carriage. The buffing bar extends the whole length of the train, and projects about five feet beyond each extremity, terminating in a buffer. This on receiving a shock transmits it to the set of springs through a cross piece. The bar is jointed at each carriage for the purpose of disconnecting the same when desired. Another mode is by having a screw of such a pitch as to be capable of running down of its own gravity. A verge spring works between two plates, and the angle of the screw should be such as on its receiving a blow the spring would be wound up. Another apparatus is a cylinder partly filled with water, and placed under the tender, the shock being communicated to the piston through the buffing bar. For the purpose of connecting the carriages a bell mouthed socket is provided on one part, and a notched head made to the end which enters; this is forced upwards by a spring, and the attachment securely formed. To disconnect the same, a small rod is fixed to one end of the spring, which, being compressed, effects the object desired. With reference to the last part of these improvements four coils of helical springs are provided; these work obliquely upon the frame of the carriage between it and the axles of the wheels, so as to receive all shocks either from the front, back, sides, upper or lower part of the carriage, to which by this arrangement they impart a universal elastic support.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 6th of March.

Joseph Lockett, of Manchester, engineer, due Feb. 27.

Charles Smith, of Exeter, builder, due Feb. 27.

William Church, of Birmingham, civil-engineer, due Feb. 27.

Hugh Unsworth, of Blackwood, Lancaster, due Feb. 27.

Thomas Robinson Williams, of Cheapside, due Feb. 27.

Benjamin Hick, jun., of Bolton le-moor, Lancaster, due Feb. 27.

Henry Waterton, of Fulmer-place, Gerrard's-cross, Buckingham, due Feb. 27.

FOREIGN INTELLIGENCE.

FRANCE.

M. de Rambuteau, the prefect of the department of the Seine, gave an account, on Saturday, to the Chamber of Commerce of Paris, of the revenue and expenditure of the capital, of its works, embellishments, schools, saving's-banks, consumption, hospitals, &c., during the first 11 months of 1840. As compared with 1839, there was a falling off in the proceeds of the octroi of 351,709 francs, and of 3,598,000 in the amount of foreign exports declared at the custom house, and which exceeded 124,000,000 francs during the first ten months of 1839. The presumed receipts for 1840 will amount to 49,000,000 francs, in which the octroi figures for 30,653,000 francs, and the expenditure for 45,077,000 francs. The number of failures, as compared with 1839, had decreased by 166. The consumption of Paris during these eleven months is set down in the prefect's report at 65,597 oxen, 18,839 cows, and 394,286 sheep, which presents an overplus of 1,746 oxen, 1,916 cows, and 44,338 sheep, as compared with the corresponding period of 1839.

The Prefecture of Police and Municipal Guard cost the city 8,295,000 francs; the National Guard, 935,000 francs; primary instruction, 971,000 francs; the hospitals and charitable establishments, 5,563,000 francs, &c.

BELGIUM.

"The Bavarian Government," says the *Independant*, "is so satisfied with the heavy pieces of cannon recently cast for it at the Liege foundry, that scarcely have the first 150 guns been delivered, than a new contract has been entered into by it for 240 mortars, part of which are for throwing stone balls, and part upon Cohorn's principle. We learn that many foreign artillery officers have passed the highest eulogiums on the beauty and solidity of the heavy pieces above alluded to. This new contract will not give employment to a great number of hands, but will heighten the repute in which the foundry is so justly held."

RAILWAY INTELLIGENCE.

DOMESTIC AND FOREIGN.

Completion of the Viaduct on the Manchester and Birmingham Railway.—On Monday last this stupendous undertaking was brought to completion, when Thomas Ashton, Esq., the chairman of the board of directors, performed the ceremony of laying the last stone. The work itself consists of twenty-one arches of sixty-three feet span and nearly three hundred feet in height, in addition to the arches contained in the abutments. It is about twenty-one months since the foundation was begun, and during that period 400,000 cubic feet of building have been erected, and more than 11,000,000 bricks have been consumed. This wonderful structure, which, Colossus-like, bestrides the river, and connects the counties of Lancaster and Chester at Stockport, has been raised under the superintendence of Mr. Buck, the skilful engineer of the Manchester and Birmingham Railway.

Proposed Railway to Staines.—A public meeting was held at the Literary Institution, Staines, on Tuesday week, for the purpose of taking into consideration a plan for the introduction of a railway from the metropolis to Staines. The chair was taken by R. Sulivan, Esq., and many of the influential gentlemen of the town and neighbourhood were present. After the great advantages to be derived by the introduction of the proposed line had been fully explained by the chairman, resolutions were unanimously adopted in favor of the plan, and appointing a committee to promote the undertaking.

Improved Railway Carriages.—A Correspondent says—" About 9 o'clock on Friday evening an axle of one of the Greenwich railway carriages, in a train full of passengers, broke, which interrupted the traffic for upwards of two hours. Fortunately, the carriage being one of the low construction, no person received the least injury; but had a similar accident happened to a carriage of the ordinary construction the consequence, especially on a viaduct, might have been dreadful. The causes of railway axles breaking are various, and I shall mention two in particular:—first, the effect of severe frost on iron; and, secondly, the severity of concussions produced at a high speed on an uneven rigid surface, and striking against the points of switches improperly constructed."—*Times.*

The effect of the railroad is just beginning to show itself at Colne, by the coaches from the south ceasing to go through that town from Friday last. The landlord of the Lansdowne Arms is about to start a coach to the station.—*Wilts Gazette.*

Bolton and Preston Railway.—On Wednesday week a Lincolnshire engine passed for the first time on the part of the Bolton and Preston Railway just completed, from Rawstorne-bridge, near Chorley (nine miles from Bolton), to Manchester. Thursday the directors proceeded on a trip for the general inspection of the line, fixing the stations, &c., preparatory to the general opening on the 28th of January next. When the line is completed to Buxton, on the North Union Line, which it will be during 1841, it will afford a much quicker transit for passengers from Preston to Manchester (the distance being some seven or eight miles shorter) than by the present route.

Great North of England Railway.—We understand that the Great North of England Railway will be ready for the conveyance of coals on the 4th of January next.—*Railway Times.*

It is reported that the directors of the Bristol and Exeter Railway are about to purchase the Great Western Canal for the purpose of extending their line, more cheaply than they must otherwise do it, towards Tiverton and Devonshire generally.

Railway from London to Cambridge, Norwich, and Yarmouth.—A meeting was held on Wednesday at the East India and Colonial Club-rooms, in Suffolk-street, Pall-mall, for the purpose of considering the propriety of establishing a railway to join the Northern and Eastern Railway at Bishop's Stortford, to Norwich and Yarmouth, by Cambridge, Newmarket, and Thetford. The meeting was both numerous and highly respectable. The Marquis of Douro, Samuel Bignold, Esq., (of Norwich), B. Smith, Esq., M.P., Thomas Hammond, Esq., (a Yarmouth magistrate), Isaac Jermy, Esq., (Recorder of Norwich), and other gentlemen, severally spoke in favor of the object of the meeting, and moved or seconded resolutions in favor of the proposed line, which it appears is to branch from the Northern and Eastern Railway at Bishop's Stortford, thence to Cambridge, Newmarket, Norwich, and Yarmouth. A company was formed immediately, and a large number of shares subscribed for in the room. The local landowners have called a meeting in favor of the project, to be held in Norwich next week.

RAILWAY ACCIDENTS.

Accident on the Great Western Railway.—An accident occurred on Friday se'nnight, but not attended with any serious consequences. It appears that the mail which left London at nine o'clock, proceeded at an unusually slow pace in consequence of the density of the fog, and, upon its arrival at Langley Marsh, the wagon-train, which started half an hour later, overtook the former train, and a concussion took place, but, owing to the relaxed speed at which both the trains were going, no injury was sustained by the passengers, and the damage done to the carriages was trifling.

Accidents on the Birmingham and Gloucester.—Two accidents happened upon the Birmingham and Gloucester Railway on Saturday morning last, to the train which leaves Gloucester for Birmingham at eight o'clock in the morning, both fortunately unattended by any other consequences to the passengers than delay. The first took place soon after the train left the Spetchley station, and fortunately before a high velocity was attained. One of the small wheels of the engine broke, to the great alarm of the passengers as well as the driver and stoker, who jumped off the engine and providentially escaped without injury. The train was necessarily delayed until another engine was procured from Spetchley. This second engine took the train safely to within a few hundred yards of Camphill station, where the firebars, and consequently the fire, tumbled out upon the road, leaving the train to be hauled to its destination by some forty or fifty men, after a delay of some hours. We have since learned that another accident (fortunately unattended with injury to life or limb) occurred on Monday by the breaking of another of the small wheels.—*Worcester Journal.*

Accident on the Hull and Selby Railway, near Brough.—An accident, unattended with the loss of life, happened on the line of the above railway on Wednesday night last. When the train, which leaves Leeds and York for Hull at 6.15 p.m., arrived within about three miles of Brough, the hinder axle of a wagon belonging to the Leeds and Selby Railway company, containing a few goods, broke, and caused part of the following carriages to get off the rails. The engine-driver immediately shut off the steam and reversed the engine, and gradually brought the train to a stop. Fortunately all the passengers escaped without the least injury—one excepted, who slightly bruised his shoulder in getting out of one of the carriages. The guard dislocated his shoulder and bruised his face by leaping off the carriage on which he was riding; he is doing well. The engine proceeded to Hull to obtain assistance, and Mr. Locking, the secretary of the company, with other officers, immediately proceeded with some carriages to the place where the accident occurred, and brought the passengers and their luggage to Hull. The accident only delayed their arrival about an hour and a half beyond the usual time.

Fatal Accident to a Stoker.—On the evening of Thursday last, as the Buffer locomotive engine was descending the railway incline at the Red Bridge, below the Kipps, with a loaded train of wagons, Daniel Connacher, the fireman, attempted to descend for the purpose of dropping the scutches, in order to check the downward speed of the engine train, when he somehow or other got entangled, and fell among the wagon wheels. The train could not be stopped in its descent, and the consequence was, that the whole of the wagons passed over poor Dan's legs, a little above the ancles, and cut them up so shockingly that he only survived the accident about three hours. After the accident, Connacher lay for nearly three quarters of an hour on the railway, and without the slightest attempt being made to staunch his gushing wounds. The quantity of blood lost by this neglect weakened the poor fellow so much, that, when the surgeons did arrive, they found it needless or impracticable to risk amputation, and the sufferer expired in peace. While any portion of strength remained, Connacher related how the accident had occurred, and other particulars connected with his young wife and helpless infants. He was employed for many years at Calder Iron Works, and the other public works around; and was always known as a kind and obliging workman. —*Greenock Advertiser.*

FOREIGN RAILWAYS.

Stoppage of Railways by Frost.—The intensity of cold with which winter has commenced in Alsace (14 to 15 degrees Reaumur) has already produced various accidents on the sections of railroad now in use there, which every attempt to remedy proved ineffectual. In the early part of the last week all the trains were out of order, and were obliged to be temporarily suspended towards Mulhausen Thaun and Mulhausen St. Louis. The branch from Benfield to Colmar has, notwithstanding, continued to be worked, thanks to the completion of the accommodations at the station of Colmar, which admits of the machines being under cover, and sheltered from the cold till the moment they are wanted. This has not been the case in the two other sections; accidents have happened there daily. The station at Mulhausen does not yet possess accommodation sufficiently spacious, under which the locomotives can remain in readiness, from whence they can depart during this severe weather in a state of preparation for propelling the carriages. Every precaution that has been taken for protecting the engines sufficiently from the weather, has been useless. On the 15th December three trains were impeded in their progress, though on that day there were six engines at work. But an engine no sooner left the station than it was encumbered with ice and its wheels unable to turn. When this obstacle was surmounted, and the machine put in motion, a single moment's stoppage was sufficient to freeze the water in the feed-pumps, which being unable to act, could no longer supply the boiler; and the boiler becoming empty, it became necessary immediately to take out the fire. The oil also becoming congealed, could not fall on the pivots of the machinery, which ground together to such a degree that the whole machine was in danger of being destroyed. A train was detained all night in the forest of Lutterback, from whence it was impossible to make the engine move, and which became completely frozen during the time another engine was coming to its assistance. The pistons were frozen in the cylinders; the tubes of the boilers being cracked, allowed the water to escape, which froze the wheels to the rails, so that it was impossible to move. The engine which came to its assistance, after vainly attempting to put the train in motion, took the passengers on its tender, and carried them back to Mulhausen; it went again for the rest of the passengers, the guards and the baggage, and did not reach Mulhausen till eleven o'clock at night. The cold was so intense, that one of the engineers had his feet frozen. The management being unwilling to expose the lives of those they employ and the passengers to further danger, suspended the service, which was to be resumed as soon as the weather permitted.

A letter from Weimar says, "We learn from Berlin that the preparatory works for a railroad between Halle and Frankfort, through Naumburg, Weimar, Erfurth, and Gotha, have succeeded. The recent decision of the Prussian Government on this subject is a favorable presage for the duration of peace."

Effects of the Frost on the Belgian Railways. — The *Commerce Belge* says, "the 18th ult. was a disastrous day for the railway trains. All the trains, during the morning, had proceeded regularly, when, about 3 o'clock, their progress was suddenly impeded by a thick hoar frost. The train, which left Liege at half-past noon, and which only consisted of five carriages, was obliged to have a second engine at Tirlemont; and, notwithstanding this precaution, it did not reach Brussels before a quarter to seven. The train which left Ghent at a quarter to one, did not arrive at Mechlin till six o'clock. The half-past three o'clock train from Courtray was stopped by the same obstacles near Waereghem, and did not get into Brussels till fifty minutes past eight. One of these trains, although impelled by two steam engines, was unable to pass the curve near the bridge of the canal at Mechlin; not less than four engines were requisite to draw it to the station. The hoar frost, which in some situations was accompanied by a heavy fall of snow, has produced similar results on all the lines. The managers have been obliged to double, and even to triple the steam-engines on the lines, without being able to effect a regular communication.

RAILWAY THROUGH FIFE.

A subject of very great importance to the commercial interests of the country has recently aroused public attention:—the formation of a railway between the Forth and Tay has been discussed at meetings of influential gentlemen on both sides of the Frith. For calling into operation many latent sources of wealth, and for the purposes of commerce, the importance of such a scheme cannot be over-estimated. Two several lines have been suggested,—the one, by Aberdour, Auchterderran, Lochleven, &c., crossing the Tay six miles below a bridge, and running along the Carse of Gowrie to Dundee,—the total length of the line being 38 miles. The other line is proposed to run to Dundee, by Kirkaldy, through New Inn, Cupar, and Ferry-Port-on-Craig,—a distance of about 38 miles. It will be observed, therefore, that both routes stand on a par as regards distance from Edinburgh; and the preference will depend on the superiority of either,—1st, In the quality of the level; 2d, the mineral and commercial importance

of the district; 3d, The extent of population; and 4th, the cheapness of execution. At the very outset, the necessity of crossing the ferry at Dundee presents a formidable objection to the eastern line. Railway routes should, in all cases, if possible, be continuous. The advantage belongs to the western line, which connects Dundee and Perth with Edinburgh, while the eastern line leaves out Perth altogether, and reaches Dundee by no shorter route. Nor do we see how coal, for instance, could be conveyed to Dundee by a railway which stops at the south bank of the Tay, unless it were shipped there at great trouble and expense. Railways have been projected between Perth and Dunkeld, and Perth and Cupar-Angus, and this is an additional reason that the line of railway should be central. By this means its extension to intermediate points is easily accomplished.—*Scottish Pilot.*

[A meeting of gentlemen interested in the Eastern line, was held at Edinburgh, on Monday, when a committee was appointed to make arrangements for carrying it into effect. At that meeting Mr. Milne, the engineer, read a report, which stated that the sketch of the line, which had been lithographed, terminated at Scafield, (south-west of Kirkaldy), where a low-water pier is in contemplation; but from Bothill Bridge, near Auchterderran, a point in the railway line equi-distant from Burntisland, Aberdour, and Seafield, a line might be continued to either of these places wherever the best ferry and harbour accommodation shall be found, as also a line to Kirkaldy, which would intersect the intermediate coal-fields. With whatever line the harbour may be connected, it is intended to surmount the elevation of the country by inclined planes—one at the southern, and another at the northern extremity of the railway. By means of these planes the table land of the county is attained, when the average gradient of the other 17 miles is only about 5½ feet per mile, or one foot in 960, whilst the steepest gradient at any part will not exceed 19½ feet per mile, or one foot in 270,—a very easy gradient compared with those of the best paying railways in England. The distance from the Frith of Forth to the Tay, by this line, is 23 miles. The expense of formation, at £11,500 per mile, would be £264,000; estimated income, £61,695; less, £20,243 for expense of working, which would leave a revenue of £41,455, or about 17 per cent. on the outlay, subject to the tax upon passengers.]

MANCHESTER AND LEEDS RAILWAY.

TRIP FROM MANCHESTER TO NORMANTON.

(*From the Manchester Guardian*).

On Monday last, the directors of this railway invited a few friends to accompany them in an experimental trip along the line from the Manchester station to the Normanton station, on the North Midland Line, a distance of fifty miles. Our readers are aware that the portion of this line from Manchester to Littleborough was opened on the 3d of July, 1839; and that another portion (including ten or eleven miles' transit on the North Midland Line, from Leeds to Normanton) was opened from Leeds to Hebden Bridge, a distance of about 37 miles, on the 5th of October last; leaving only a distance of about nine miles unopened, viz., the portion from Littleborough, through the Summit Tunnel and Todmorden, to Hebden Bridge. Of course, therefore, the objects of attention on Monday were these new portions of the line, especially that stupendous work of human skill and industry, the Summit Tunnel. The more interest was felt about this tunnel, from the recent accident to a small portion of it, by the pressure of the surrounding earth or rock, causing portions of the inverted arch, that part of the tunnel upon which the rails are laid, and which is covered by earth or "ballast," to fall inwards and upwards: a circumstance respecting which the most exaggerated reports were current last week in Manchester. It being a part of the proposed arrangements for Monday, that the directors and their friends should walk through the tunnel from one end to the other, by torch light, so that they might judge for themselves of the nature of the work as a whole, and of the extent of this accident, which, in fact, is only unfortunate as delaying the opening of the line throughout for three weeks or a month,—there was considerable interest manifested on the part of the gentlemen, directors, and others, who formed the party on Monday morning.

The party started in carriages attached to the ordinary nine o'clock train, drawn by the *Junction* engine; all the engines on the line being named after the places of its *termini* and principal stations, the rivers it crosses, &c. The train left the station at six minutes after nine, being signalled to start by a boatswain's whistle, instead of the ringing of a bell, as is the usual custom on railways. In 12 minutes the train had reached Mills Hill, the station for Oldham and Middleton, and in seven minutes more the place where the Heywood branch is to diverge to that place, a little beyond where the line crosses the canal. Here the train abated speed to allow a cursory view of the works for this branch line, which are in rapid progress. An embankment is already formed to some extent, near the point of junction; and wagons laden with earth were traversing the temporary rails on this embankment. The length of this branch will be about a mile and a half. The train reached Rochdale at 28 minutes to ten, or in about 26 minutes from Manchester, and arrived at Littleborough at 18 minutes to ten. Thence, having detached the ordinary carriages, the special train proceeded along the line (not yet opened to the public), to the mouth of the Summit Tunnel, a distance from the Littleborough station of about a mile and a half, or 15 miles from Manchester; and here the company alighted at seven minutes to ten o'clock.

The Summit Tunnel, even at its mouth, presented a very striking picture. Amidst piles of crags, whose face and form have been altered by the labors of man and the blasting of gunpowder, rises a fine massive arch of masonry, of admirable workmanship and elegant proportions; approaching, perhaps, to the Moorish arch in its form, which is elliptical, but the crown of the arch is formed of the end and not the side of the ellipsis. Within this arch were upwards of fifty men, laborers and excavators, each provided with a torch or lantern; and the glare of light already revealed to the approaching party the interior proportions of this extraordinary subterranean viaduct. The party were received by Mr. John Stephenson, the sole contractor for this great work, Mr. B. Dickinson, and other parties connected with it, and immediately quitted the daylight for this spacious and lofty cavern. Those who have passed through the tunnel at Edge Hill, on the Liverpool line, or other smaller works of this kind, can form but a faint conception of this splendid construction. The Edge Hill tunnel is about a mile and a quarter in length; the Kilsby tunnel, 2,398 yards; the Summit Tunnel is 2,869 yards in length. From the rails to the crown of the arch, the height of the Summit Tunnel is 21 feet 6 inches; and this loftiness, together with the ventilation secured by means of the various shafts, and the general dryness of the interior, will make this tunnel one of the most pleasant, in every respect, that can be traversed, and at night, but for the lights carried with the trains, it would not be easy for a passenger to distinguish between the interior of the tunnel and the open air. The width of the tunnel at the level of the rails is 22 feet; but its greatest width (about six feet from the ground) is 24 feet.

The party, escorted by the numerous body of torch-bearers, entered the tunnel; and many gentlemen expressed their surprise to find it so lofty and spacious. Even if the tunnel were in a perfectly straight line, it would be impossible to see from one end to the other, owing to the gradient being about 40 feet from end to end, while the height of the tunnel from the rails is not quite 22; but in addition to this, there is a slight curve at each end of the tunnel, for a length of about four chains, which, at first entering it, prevents the visitor from obtaining, even by torch-light, an extensive view of this remarkable work. This curve having been passed, however, the effect was very striking; the long and spacious arched vista, seen distinctly by the glare of the torches in advance of the party, presented none of those points of discomfort which persons are apt to suggest to themselves in connection with tunnels. In the place of walls green with damp, or dripping from a thousand apertures, the brickwork, except in two or three places through its whole length, was smooth, dry, and in every respect resembling the inside of a wall of a house before the bricks are covered by plaster. The company passed under several shafts, the upper apertures of which were closed; and, finding that their progress was in no way impeded by collapsed walls, or other results of the late accident, gentlemen might be heard inquiring of Mr. George Stephenson, Mr. Gooch, or others in the engineering department, where the accident had happened. At length, after a distance of somewhat less than half a mile had been traversed, from the mouth of the tunnel, the party came to the place, which is between shafts Nos. 2 and 3. All the effects visible are the unevenness of the ground in places: and, from the "ballast" being forced upwards, the culvert has also been displaced, and hence small pools of water are formed; but the whole of the walls and roof, from the level of the ground upwards, were as firm and as perfect here as in any other part of the tunnel. As a matter of precaution, strong beams had been placed across the arch at a height of five or six feet above the rails, to support the sides of the tunnel; but there was not the slightest appearance or apprehension of their giving way. The brick-work did not show the least warping or deviation from the peculiar curve which forms the visible arch of the tunnel; and there seemed to be a general feeling of satisfaction at finding the accident of so trivial a character. It seems that here the invert is so built as to form a skewback for the spring of the upper arch; but this had partly been made to rise from the material in which the excavation was made, viz., a sort of blue shale, which was deemed sufficiently firm in itself to render it needless to build the invert of very great strength at this point. Experience has proved, however, that this shale, when subjected to the influence of the atmosphere, is but a treacherous support; it has become converted into a sort of quick-lime, and, falling away, has left the lip of the invert to support alone the pressure of the arch above; and hence the springing of the invert inwards and upwards, which has caused the accident. In consequence of having the shale to work against, the men, in the erection of this part of the tunnel, proceeded more rapidly than in any other portion of the work, relying on the strength of the shale. Mr. George Stephenson said, he wished particularly that every one would examine minutely the arch above, where they would not perceive the slightest fracture. All that would have to be done would be to take up and rebuild about 80 yards of the invert, below the level of the ground.

Before leaving the Summit Tunnel, we may just state that there is, we believe, some intention on the part of the directors to establish a telegraph from one end to the other, which will probably be a pneumatic telegraph; by which means, intelligence may be communicated from one mouth to the other, of the approach, entrance, and exit of trains, with a view to prevent any danger; and we understand that another regulation to this end will be made, of great importance—viz. that no train will be admitted on the same line of rails till the previous train has been signalled to have quitted the tunnel at the opposite end. The trains, on emerging from the north end of the tunnel into the elliptic shaft, will immediately afterwards plunge into a second short tunnel, about seventy yards in length, of the same width as the Summit Tunnel, but measuring only 17 feet 6 inches from the rails to the crown of the arch, in consequence of the river Calder flowing through the valley above it.

The company found in waiting in the elliptical shaft a special train, drawn by the engine *Leeds*, made by Messrs. Shepherd and Todd. Having entered the carriages, the company were soon in

rapid motion through the short tunnel, and thence emerged into a basin of natural mud, in which it had been found necessary to support the walls of the cutting for the line by piles driven into the soft silt. Shortly afterwards, the train entered the Winterbut Lee Tunnel, which is about 300 yards in length, and thence kept the turnpike road on the light or east of the line to Clough Mill. The next great work approached on the line was the Gauvholme Viaduct and Bridge,—a noble structure. The line passes through Gauvholme, leaving the road to Bacup and the warehouses of the Rochdale Canal Company to the left or west. The train stopped awhile in order to enable the directors and their friends to alight and descend to the bank of the Rochdale Canal, over which the line passes by a splendid cast-iron skew bridge, with handsome abutments of solid masonry. This is believed to be the finest specimen of the skew bridge in the world. The span is 102 feet, and it crosses the canal at a height of about 40 feet from the surface of the water, and at an angle of a skew of 270. After spending a few minutes in inspecting the viaduct, the company re-entered the carriages, and at half-past eleven were again in motion. Passing through a cutting, they soon came to the mill-studded vale of Todmorden; while in the distance to the right was seen the eminence called Studley Pike, topped by its stone pillar, commemorative of the declaration of peace. The line passed through Todmorden, leaving the old church to the right or east, and the new church to the left or west of the railway. Here the line is carried on a viaduct of seven arches, and thus the scenery of the valley is more fully displayed to the traveller. The party were loudly cheered as they passed through Todmorden. The hilly nature of the country again compels the line to seek its way through the bowels of the earth; it passes through the Millwood Tunnel, a distance of 220 yards, and the Castle Hill Tunnel, which measures about 200 yards, and the train emerges from this tunnel by a very handsome stone arch. Croft Stones Church is seen on the hill to the left, and the line then continues by alternate cuttings and embankments to the Horsefall Tunnel, which is about 270 yards in length. Emerging from this, the valley, becoming narrower towards the gorge, at its north-easterly extremity, three rival lines of communication are seen pursuing their way side by side, the railway being flanked to the left by the turnpike road, and to the right by the Rochdale canal. The party next came to Charlestown, where there is a diversion of the line to the right of a hill, through which numerous efforts were made to cut the Charlestown Tunnel; but the loose nature of the earth, the whole hill being composed of a moving, sliding, sandy earth, it was found necessary, at least for the present, to abandon the work, and the tunnel is now closed. After this short *detour*, the line comes to the gullet of the valley. The village and church of Mytholm are next passed, and a small tunnel traversed; and the line then passes the village of Hebden Bridge, at which there is a station, distant four miles from Todmorden, and seven or eight miles from the Summit Tunnel. Here the still unopened portion of the line ends; this being the place where coaches wait to convey passengers from Leeds forward to Littleborough, where the railway again receives them.

The other portion of the line has been previously described.

PREVENTION OF RAILWAY ACCIDENTS.

(*From the Tyne Mercury.*)

Sir George Cayley, the member for Scarborough, recently published a letter in the *York Herald*, in which there is much theory, though there may be found some valuable hints on this subject. Amongst other things, he suggests that the wheels should have [illegible] hold on the rails instead of one and a half. This has generally been considered as likely to add very greatly to the friction. We were about to say we cannot see how it would do so but when the carriages were likely to get off, and then the more it added the better. But it would also add something on account of the increased weight of the wheel, so that between the weight and the augmented drag, whenever the line was not perfectly straight, it would be a serious consideration. We agree entirely with Sir George as to the propriety of a parliamentary committee, and also that all the engineers and other scientific persons should be called before them. This perhaps every one has already thought of and talked about; but it is, nevertheless, important that influential men should bring such suggestions before the public. There must be a parliamentary inquiry; that is a matter of certainty. As to all the plans proposed for remedying the evil, they would be, without such an inquiry, like 'Chaos worse confounded.' But we proceed with the propositions which have been brought before the public:—Sir George Cayley shows that the buffers commonly employed have not the resistance required, and that the expense incurred in making them so will be enormous. He comes to a long piston in an air cylinder, with a stuffing-box for the piston rod. We cannot go into his calculations from want of room; but such a contrivance to come exactly in the centre of the engine or the last carriage must be of considerable power. The main question is, will the expense be great? for we see some extraordinary plans proposed of rails in the middle of the line with bars to project outwards in case of a train likely to go off the rails, which we believe would be about as expensive as the whole line itself. This piston plan, we think, would not prove to be so, because, though of some considerable cost, we conceive it would save much money in ordinary buffers—indeed, we remember an accident of one shock, on one of the railways, where the engineer himself declared that two hundred pounds would hardly pay the damage. But Sir George Cayley's plan is to have the great piston in advance of the engine. We would have thought it much better between the engine and the carriages; and at the end, instead of being, as he proposes, between the last carriages and nothing; we would have advised such a safeguard between the intermediate carriages and the last. In case of coming off the line, unless such a piston should be like the Irishman's gun, which was made to shoot round a corner, we cannot conceive the use of it. In going straight forward, unless to meet trains coming on the same line, it could be of very small use, indeed; and where the object was to prevent accidents in going off the line, it is impossible to see where it could be employed at all—except, indeed, it had some extraordinary swivel joint, of which Sir G. C. does not at all inform us. This scheme is, therefore, clearly not against accidents in general on railways; but against accidents from collision alone. A Dr. Wilkinson, of Bath, proposes a plan to prevent collision nearly similar to that of Sir G. Cayley, except that he brings it forward in a much more simple and easily understood manner. He proposes a large cylinder and piston at each end of every train, so that whenever a collision took place, *two pistons would meet*, and by the immense pressure of air behind, the effect would be comparatively trifling. We conceive that, however useful these inventions may be found, the best mode of all would be to cause the servants of those railways to attend strictly to their duty. There is no doubt that pistons may save the expense of buffers, and that a great depth of wagon wheel on the rail may be advantageous; but the main question to be decided before a parliamentary committee is,—How far you must go to benefit those concerns, and how far are you interfering with the business of the men who are hired and abundantly paid to watch over them? We said, a few weeks ago, that the great object was to have proper guards, enginemen, and drivers; that if the switches, the engines, the wheels of the carriages, and all the regular minutiæ of such concerns, were well attended to, little else would be required. We are still of the same opinion. All that mechanism—all that science in general can do, to make modes of conveyance safe, ought to be employed. But the attention of man, and great attention, too, will still be required. To go beyond this, we come to the schemes of the people in one of Swift's stories, where they put science to an equally ridiculous purpose—to the taking measure for coats by the quadrant! Indeed the many schemes proposed would almost cause one to imagine that it would be an immense improvement if coats, and shoes, and hats, could not only be self-created, but come and fit themselves to men's heads, bodies, and feet!

PROGRESS OF RAILWAYS IN 1840.

(*From the Railway Times.*)

The year which is now fast drawing to a close will, for many reasons, be memorable in railway annals, and hence a slight retrospective glance at some of its leading characteristics, may not be without its use.

Within the last twelve months many additional miles of railway have been brought into successful operation—successful, we mean, so far as the public are concerned, for the result as regards the proprietary is yet, in several cases, doubtful. It is, indeed, a distinguished peculiarity of the system, that wherever a new line of railway is opened up, the public must of necessity be gainers. We hear much of the monopoly of the means of communication which railway companies possess, but it is only such a monopoly as those who supply a better and cheaper article than their rivals, must ever enjoy. In obtaining from the legislature leave to construct their several undertakings, railway companies did not at the same time secure power to put down the previously existing conveyances; they were not authorised to shut up the ancient highways of the kingdom, and to compel the public to travel by the new roads or to remain at home; and if this effect has invariably followed the introduction of the railway system into particular districts, it is only because the public have voluntarily given the preference to the latter. While this preference continues to be deserved—while the public can be conveyed more cheaply, more expeditiously, more comfortably and more safely, by railway than by road—so long and no longer will the new mode of locomotion flourish at the expense of the old. The extension of railway communication which has marked the present year must necessarily, therefore, have proved already a national benefit, and it is to be hoped will ultimately be attended with corresponding advantage to those through whose enterprising exertions it has been accomplished. Many of the lines recently brought into operation will act and re-act upon each other, by developing still further the resources of districts which have heretofore experienced, to a limited extent, the facilities which railways so peculiarly present, and by opening up the latent capabilities of other parts—thus giving an increased impetus to travelling in general, and especially to the traffic of particular lines. The extraordinary augmentation which has taken place in the number of persons travelling by railways even where only partially and imperfectly opened, as compared with the traffic which previously passed over the same routes, is the best proof that could be given of the estimation in which this mode of communication is held by the public, and the surest omen of its future prosperity.

Nor is it by the patronage alone which has been extended to lines in operation, that the public voice has declared in favor of railways. Not only have districts possessing the means of improved transit availed themselves of such means, to a most remarkable extent, but in those parts of the country which at present are without them, the greatest anxiety has been evinced to secure a participation in railway facilities. We might bring forward the cases of Falmouth, Salisbury, Doncaster, Blackburn, Scarborough, Norwich, and many other towns, in illustration of this remark. In each of these instances the propriety, the policy, we might add, the absolute *necessity*, of constructing a railway has been *forced* upon the consideration of parties, frequently far from prepossessed in favor of the new system. They have seen that their pros-

perity depends on being placed upon an equality with other districts in respect of the means of local or general intercourse, and hence the strenuous efforts that are now being made to effect that object with the least possible delay. This has been pre-eminently a characteristic of the year now passing away, aud more than makes up for that absence of general speculation, which has equally marked its progress. We have had fewer companies "got up" by individuals having temporary purposes to serve, but there has been much more than heretofore of a souud and discriminating support of railways for the benefits which they are calculated to confer upon their immediate localities. Share-speculation may have been checked, but the true interests of railway enterprise, and of the country generally, have been promoted.

Another noticeable feature in the railway history of the present year is the gradual change which has taken place in public opinion as to the value of this species of stock. We do not say, that the shares of many companies are not at this moment in the market, as they have been for months past, at prices greatly below their intrinsic value, nor will we conceal our opinion that in one or two cases the Stock Exchange valuation will not be justified by the actual results of the undertakings to which they refer; but it is gratifying to find that much greater regard is now paid than at any previous period to the real merits of particular lines, as distinguished from the baseless promises of projectors, and the day-dreams of expectant shareholders. The mania for indiscriminate speculation has passed away, and a sober appreciation of actual circumstances has succeeded. Careful calculation and inferences therefrom have taken the place of vague assurances of future prosperity. A new class of proprietors has moreover gradually spruug up—we mean a class of permanent investors,—who, grounding their judgment of an undertaking upon its intrinsic merits, are not swayed to the sacrifice of their property by every idle rumour, concocted or circulated by interested jobbers. The more that such a spirit as this prevails, the more secure and stable will railway property become. The fluctuation of shares, arising in most cases from no clear, certainly from no sufficient cause, has done much to prejudice the cautious against embarking their property in so varying a venture, and has in many ways, upon which we need not at present enlarge, impeded and counteracted the exertions of boards of management. The accession of the class of permanent holders, to whom we have just alluded, will at once rescue railway uudertakings from the charge of being mere stock-jobbing speculations, and encourage the several directors to adopt and persevere in measures which, whether they attain present popularity or not, cannot fail to conduce to the lasting prosperity of their constituents.

TO CORRESPONDENTS.

J. A., *is not singular in his complaint. Numbers of inventions are lost for want of a cheaper mode of protecting the property of inventors.*

VINDICATOR *is under consideration.*

A "RAILWAY DIRECTOR" *should state more distinctly the means he suggests for improving the carriages on railways. His description, if published as it is, would be unintelligible.*

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, JANUARY 2, 1841.

The INDEX *and Title Page for the Third Volume of the* INVENTORS' ADVOCATE *will shortly be Published, to enable Subscribers to have their sets bound. The present number is the First of the Fourth Volume.*

The difficult question of regulating the employment of children in manufactories, is now before the Legislature of France, and seems to be attended there with the same, or even greater perplexity, than the determination of the same subject in England. Any fixed regulation of wages and labor between workmen and their employers, is generally to be deprecated; because it tends to give an unnatural complexion to the manufacture concerned, which must either soon sicken and decay, under such a vamped-up process, or the regulations will shortly be, by some means or other, evaded. A workman has a right to get as much for his labor as it will procure in the market; and the employer ought not to be compelled to pay more for labor than in free competition it can be obtained. But to maintain the freedom of both workmen and their employers, there must be nothing like combination on the one side or the other. From the instant a combination is formed, especially when it partakes of the nature of intimidation, the liberty of the masters and workmen is restricted; and if they countenance regulations, binding on themselves, to keep up or to lower the rates of wages, they render the interference of the legislature not only excusable, but absolutely essential, to settle, on a just foundation, the conflicting claims of the two parties.

Freedom of labor ought to be maintained with the utmost jealousy, and it is only special circumstances that can render interference with it advisable. The question, then, to be determined, in the first place, in considering the subject of children's labor in manufactories, is, does the employment of children present such especial circumstances as to justify the interference of the legislature for its regulation? We think that all who have perused any portion of the evidence given respecting the condition of children in the factories, not only of this country but of France, must come to the conclusion, that measures are required to put a stop to the system of working infants beyond their powers of endurance, so as to injure their healths, to distort their bodies, and to prevent them from having time for recreation or instruction. The fact is too well established to be denied, that the majority of parents employed in manufactories are so eager to increase their scanty wages by the pittance their children can earn, that they care not how many hours they labor, nor how their bodily condition is affected, still less how their mental culture is attended to, so that by their exertions a few shillings a-week may be added for the week's supply of food and drink. This state of things is deeply to be deplored, and ought to be remedied, if it lies within the power of laws to effect a remedy; but as it exists, and must require a long time and a great change of circumstances, before any remedial alteration can be produced in the condition and feelings of the workmen, we must in the meanwhile adopt measures to prevent the mischievous operation of the present system from destroying the health and vigor of future generations.

When the natural guardians of the children neglect their duty, and either from want of feeling or hard necessity, consent to injure their bodily frames, aud to allow their minds to be neglected, it then becomes the duty of the Government to take them under its care.

The difficulties in settling the question rise principally from the circumstance, that the children employed are wanted to attend upon and assist the adults, who are of course capable of working longer without injury or fatigue. To shorten the labors of children must, therefore, diminish the hours of work of the men on whom they attend. To meet this inconvenience relays of children have been had recourse to, in England since the factory regulations have been made; and a similar plan

must be adopted in France, though it is attended with expense which the manufacturers would fain avoid. For this purpose an amendment to the law was proposed in the Chamber of Deputies, to the effect that no children should be employed who were not old enough to bear to work as long as their parents. The age of ten was proposed, but this is evidently much too early an age for a child to endure a constant application for twelve hours. Besides even at the age of ten, it was objected, that there would be too much restriction on the parents, who could not afford to maintain their children so long without employing them in some profitable labor. Eight is the age fixed on by the French Chambers as the earliest period at which children shall be employed, and the number of hours they are to be worked is limited to eight, until the children attain the age of ten, when two hours are to be added to their daily labor. In France, indeed, a difficulty presented itself which was not encountered in the consideration of the question in England, arising from the different states of maturity at which children of the same age arrive in the northern and the southern provinces. It was at one time contemplated to make a distinction in this respect in the laws applicable to different parts of the kingdom ; though this notion was afterwards abandoned.

The restriction of the labor of children is a question of principle, before which all considerations of expediency should give way. If it be essential to the maintenance of any manufacture that the health of the younger portion of the population must be injured, and their moral condition degraded, the manufacture itself should be abandoned. Nay, even were the present condition of society involved in the question, and if the existence of a country as an independent nation were at stake, it would even then become a matter worthy of grave consideration, whether the sacrifice required were not greater than the objects to be maintained deserved. Any state of society, or any manufacture, which necessarily requires for its existence, or superiority, the loss of health and enjoyment in childhood, must rest on a bad foundation; and the welfare of the people would require that it should be changed or abandoned. Legislation for regulating the labor of children should be founded on that broad principle :—their health, their enjoyment of life, their moral, religious, and intellectual culture, should be the main considerations. If the strength they are able to exert can, compatibly with these essential requisites, be profitably employed, so much the better; but their training for after-life should be the end in view, and not the amount of profit to be derived from their infant labor at present.

We are glad to find that the French Chamber of Deputies, notwithstanding the turmoil of threatening war, have considered this subject too important to be longer delayed. We only wish that they, as well as our legislators, had proceeded upon a broader basis.

NEW INVENTIONS.

PAPYROGRAPHY.

We last week gave from the *Moniteur Industriel* an account of a new invention for reproducing drawings, manuscripts, and all kinds of designs to an unlimited extent, and by means much cheaper than at present known. This process, which is called by M. de Manne, the inventor, *Papyrography*, is more fully noticed in a subsequent number of the *Moniteur*, from which we abridge the following particulars.

The mode by which M. de Manne produces designs, &c., on paper, is thus described. After having, by means of his prepared metallic ink, traced the drawing on common writing paper, he contrives, by an operation which he at present keeps secret, to make the lines rise from the paper in relief, and become extremely hard and durable. He fixes this matrix on a plate of metal, on which he then places the paper that is to receive the impression. Over the paper he places a piece of silk, and passes it under the roller of a copper-plate press; when the characters and lines on the manuscript or drawing are reproduced, stamped in on the paper. These designs thus fixed on the plates are hard enough to allow of a great number of impressions being taken without injury to them.

The part of the invention, which consists in obtaining plates of metal cast from the matrix afforded by the drawing on the paper, is considered by the committee of the Society of Arts of Mulhausen, who were appointed to examine it, as of still greater importance than any other. By this engraving on paper, say the committee, may be obtained impressions fully equal to what can be had from wood engravings ; by this means, therefore, works which require illustrations may be printed with great cheapness. In engravings on wood, the design and the subsequent cutting are necessary, but by the papyrographic method, the design is the only expense; and it will produce without end as many engraved plates and impressions as may be required, at a cost one half of that of the ordinary process; and with a precision equal to that of the original drawing.

As M. de Manne conducted his experiments at Rouen, where there was no skilful metal founders, he labored under great disadvantage in his attempts to bring his invention to perfection, but the specimens he sent to the committee were sufficient to convince them that his plan was capable of answering all that he stated. Some of the specimens sent to the committee presented the designs, and the printed copies from them in relief to the height of from two to three millimetres, obtained solely from the matrix traced on paper. The committee propose to extend the invention to the printing of woven fabrics and paper. M. de Manne sent some plates prepared for this object, but owing to the disadvantages under which he labored, the plates were not so perfectly cast as they ought to have been, to produce the desired effect. The defect, however, he ascribes entirely to the unskilful manner in which the Rouen founders took the cast of his matrices; for not venturing to trust them with the paper moulds, he took casts of them in plaster; from which the metal plates were afterwards cast. It is to this circumstance that M. de Manne attributes the failure of his experiment, as it was difficult to take the cast in plaster from the paper so as to preserve the sharpness of the outline. He says he is certain of the success of his process as applied to the printing of papers and calicoes, but want of means with him, as with many other inventors, prevents him from taking out patents, or from carrying the invention into operation. The committee report that it seems to them highly probable that if the inventor was placed in more favorable circumstances, he would arrive at remarkable and very useful results. In conclusion they recommend the society to grant him a silver medal, though the invention is not of a nature within their usual subjects for prizes.

BRICKS AND TILES MADE BY MACHINERY.

The French Academy of Sciences lately appointed a committee to examine a machine for making bricks, invented by M. Carville, of which they gave a favorable report, the substance of which we subjoin.

The committee proceeded to examine the action of the machinery in reference to its three principal functions,—of mixing the materials, of moulding the bricks, and afterwards of extracting them from the moulds. The mixing of the clay is performed in a vertical cylinder, by means of an iron axle, to which arms are fixed at different heights, which are furnished with knives. A rotary motion is given to the axle, by the power of a horse, applied at the end of a long lever. The materials are thrown in at the upper end of the cylinder, and when properly mixed, are passed into the moulds, through an opening in the side towards the bottom. Inclined boards, in the form of the sails of a windmill, are connected at the lower end of the vertical axle. The pressure resulting from the inclination of these boards constantly pressing against the clay during their rotatory motion, forces it out of the opening; a small vane, formed of iron plates, regulates and restricts the manner in which it issues out. An endless chain, composed of moulds of cast iron, joined to each other by hinges, passes under the base of the cylinder, and the moulds are thus filled with the prepared clay. A heavy roller, of cast iron, begins the compression; it is finished by drawing the loaded moulds through a compressor, composed of two plates of iron, the surfaces of which are not quite parallel. The removal of the bricks from the moulds takes place immediately after the compression, by means of a rammer acting from above. By causing the rammer, during the process, to move in the same direction as the chain of moulds, a continuous action is obtained, by means of very simple mechanism. The moment when the blow of the rammer should be given is very ingeniously determined, by joints fastened to the moulds. This motion, thus derived from the chain of moulds, and acting invariably with it, prevents the inconveniences that would result from the lengthening of the chain, by the inevitable wearing out of the hinges. The adhesion of the earth to the sides of the moulds, is avoided by their being immersed, for half a revolution of the cylinder, in water, with which a vessel placed under the machine is filled.

Two hoppers are introduced in the machinery, before and after the reservoir, where the earth is prepared. They spread in the requisite quantities the fine sand with which they are constantly supplied. One of them spreads the sand before the moulds are filled, upon plates of iron, connected together so as to form an endless chain, which serves as the bottoms for the moulds. The other hopper sprinkles the surface of the bricks before compression. Thus any adhesion of the substance continues to be avoided both with the roller with which the compression begins, with the iron work which completes it, and with the rammer which removes the clay from the mould. For greater precaution, and in order to obtain more regular surfaces, a slight stream of water continually moistens the pressing roller. The bricks are received on an endless chain of iron plates, after they are taken from the mould, by which they are conveyed to the kiln. The power of a single horse, by turning a wheel, prepares and moulds about 1,500 bricks in an hour.

The commissioners, on concluding their report, observed, that they had convinced themselves of the complete mixture of the substances forming the bricks, by breaking and inspecting several of them. They inspected the whole process, and so far as the result of the manufacture was concerned, they express themselves perfectly satisfied. As to the saving to be effected by it, they had no ground on which to arrive at a satisfactory conclusion, so as to confirm the statement of the inventor, who affirms, that for the cost of two francs he can mould a thousand bricks. From their inspection of the working of the engine, they were enabled to think that this statement is correct.

NEW MANUFACTURE OF PAPER.

The materials intended to be converted into paper are usually softened either by means of putrefaction, or by beating. Putrefaction is a chemical operation which possesses some advan-

tages, but the inconveniences attending it are so numerous and serious, that the progressive improvement of the manufacture of paper occasions its use to be, if not altogether laid aside, at least to be very considerably limited. With respect to the softening of rags by merely mechanical means, it can only be done by the machinery now employed by a great loss of time and a great moving power. It has been thought that this operation could be brought to perfection by altering the method of trituration, and accordingly the softening of rags, old cords, &c., has been effected by submitting the substances, either dry or moistened, to the action of a roller, or a vertical mill-stone turning on a solid surface. The rags, when sorted, bleached, and torn to pieces by these machines, only require to be sieved before they are converted into paper.—*Moniteur Industriel.*

NEW KIND OF LOCK ON CANALS.

Mr. Smith, of Deenston, explained at a recent meeting of the Institution of Civil Engineers, a new system of lockage for canals proposed by him, a model of which he presented. To avoid the present expensive construction of locks and their waste of water, the author proposes to divide the canal into a series of basins, the water levels of which should be from 12 to 18 inches above each other. The extremity of each basin is so contracted as to permit only the free passage of a boat; in this is placed a single gate, hinged to a sill across the bottom, the head pointing at a given angle against the stream, and the lateral faces pressing against rabbets in the masonry. The gate is to be constructed of buoyant materials, or made hollow so as to float and be held up by the pressure of the water in the higher level; on the top is a roller to facilitate the passage of the boats. When a boat is required to pass from a higher to a lower level, the low end, which must be armed with an inclined projection, depresses the gate as much as the depth of the immersion of the boat, and as much water escapes as can pass between its sides and the walls of the contracted part of the basin. The same action takes place in ascending, except that a certain amount of power must be expended to enable the boat to surmount the difference of level between the basins. The quantity of water wasted by each boat would be in proportion to its immersion and the speed at which it passed over the gate. In case of different sized boats passing along the same canal, it is proposed to have a small gate forming part of the main gate, so as to avoid the loss of water which would ensue from the whole width being open for the passage of a small boat.

RAILWAY INDICATOR.

A machine has recently been exhibited, called an "Indicator" of the passing of carriages or trains on railways. This instrument is designed and will most completely effect the inventor's intention, to show to the conductors of a succeeding train the distance in time of a train in advance, through a period of fifteen minutes, or longer if necessary—thus holding out the caution to trains in quick succession that they are only two, three, or more minutes apart, and to use their locomotive power accordingly. For night service the usual colored light is presented by the machine for the same period. It is suggested that an indicator should be placed at each mile along the line of way, by which means a complete and never-failing system of signals will be established at the first cost of £20 per mile, aud the annual expense of about £5 for lights.

NEW METHOD OF OBTAINING A FOUNDATION UNDER WATER.

M. Poirel, who has executed very important works at the port of Algiers, during the years 1833 to 1840, has suggested a new plan of obtaining a foundation under water, which consists in making use of very large blocks of factitious stone.

The plan now generally adopted in making the foundation of a jetty in the sea is to throw in large quantities of stones. It was practised by the Romans, as is proved by the remains of the port of Civita-Vecchia. The stones of which those ancient jetties are composed, are of various sizes. Their removal by the sea is less frequent, and, indeed, rarely occurs when their foundation is sufficiently sloped and extended. But besides its being questionable whether this foundation can ever acquire perfect stability, these sloping jetties are attended with the inconvenience of considerably restricting the passage of vessels, and they limit the extent of the ports which they are intended to form. It would, then, be a great improvement in these constructions if blocks of stone only were used of such a size that they could not, under any circumstances, be carried away by the waves. This is very possible, as the action of the water is proportionate to the opposing surface, while the resistance of the block increases the weight. M. Poirel has stated that at Algiers a mass of the size of 10 cubic metres was necessary to render the block immoveable. He would not, however, entertain the notion of having masses such as these taken out of quarries entire, on account of the difficulties of quarrying and carriage. There remained no other plan than that of manufacturing artificial blocks, and he has consequently been induced to make use of masses of factitious stone. These blocks are made in two different ways. Some are constructed in the water in the place they are intended to occupy, others aro manufactured on land to be afterwards thrown into the sea. The former are made by putting a composition of cement and stones, that will harden by exposure, into empty boxes. These boxes are formed of large canvas bags covered with tar; the sides of which are strengthened by four beams of timber, on which the canvas is stretched and fastened. The mass of compost which it contains, can then very easily be moulded on land.

The second kind of block, which is made on land, is manufactured in boxes without any bottom, formed of four moveable pieces of wood. Five or six days after it is filled these pieces of wood are removed, and are used for another block. The composition thus exposed acquires at the end of a month or two, or at least at the end of the following season, sufficient consistence to render it ready to be thrown into the sea.

M. Poirel prepares his blocks on the trucks which are moved on railways. He uses two methods of sinking them; the first by causing the block to be placed on two planks that have been greased, and by giving the wagon a slight inclination, which is all that is required to cause the block to glide down impelled by its own weight. In the second method, the block, placed on an inclined plane, is in the first place moved into the water till it is immersed the depth of a metre. It is fastened to a kind of lighter made of large casks, which carry it along maintaining its position in the water.

The Romans, as we find by some of their works which remain to us, had previously executed foundations made of factitious stones in the sea. Colonel Erny, in a publication which appeared in 1831, had particularised all the inconveniences of the plan of throwing in loose stones, and had also proposed making use of factitious blocks, but he only suggested connected masses having a determinate outline.

INDESTRUCTIBLE CANDLES.

An imposition of an ingenious kind has been successfully practised in some of the French provinces, by a man named Louis Beccaris, who undertook to sell "incombustible chemical candle lamps." This was his mode of going to work:—

He left in the various houses of a district a number of prospectuses, printed on green and rose-colored paper, and adorned with vignettes, representing the different instruments of a chemical apparatus, upon which might be read the following, amongst several other interesting matters: "Chemistry is a science which informs us of the intimate and reciprocal actions of all the bodies and elements in nature. Arnaud, advantageously known by his brilliant scientific labors, has imposed upon himself the long-meditated task, having for its object at once to encourage industry, and to make it profitable to the world. The fruits of this exclusive toil, and of the experiments which he has made upon these novelties of his own discovery, has begot the most intimate convictions, which he would also impress upon *MM. les consommateurs*, that the new candle-lamps invented by him are superior to every other article of the same description which has been seen up to the present day, &c. The herein above-mentioned inventor does not at all wish to leave the consumer in ignorance of the constituent and plastic principlo of the aforesaid candle-lamp. In brief, it is a fibrous mineral, gathered on the mountains of Vesuvius, and the summit of Sicilian Etna. Consequently, being fully conversant with the cause of the afore-mentioned incombustible fibre, he has conceived the project, by the agency of combined chemical, physical, and geological forces, to construct candles thereof, which shall unite the useful with the agreeable, and be recognised as indestructible. All chemical, physical, and geological questions being alike founded on the immutable laws of nature, Arnaud seeks not to influence any individual by publishing the indestructibility of these candle-lamps; but he has formed of this mineral a positive abstraction, by which one thing may be separated from another, to consider it sole and exclusive."

This was followed by an enumeration of the marvellous advantages which the candle-lamp invented by Arnaud offered to the public, the least of which was, that it lasted for a *minimum* period of five years, furnished each day a brilliant light for six hours *de suite*, without the necessity of being "alimented" otherwise than with a few drops of oil, and called not for the slightest aid from snuffers, fingers, scissors, knitting-needles, &c.

The prospectus concluded with these words:—"Arnaud, to facilitate alike the evidence and progression of this incomparable novelty, will send his agents instantaneously into the provinces to facilitate to consumers the means of providing themselves. *Nota.* The depôt having been constituted in accordance with the forms designated by law, he will rigorously pursue every attempt to counterfeit his production. He will treat with country dealers for the sale of his article on commission. The general depôt at Paris allows to country *commerciants* 30 in the 100. All communications *franco.*"

A vast number of persons became the dupes of this pompous announcement. When the prospectuses had been sufficiently distributed, and had been also allowed a sufficient time to circulate, in order to produce their full effect, Louis Beccaris, a pretended traveller from the house of Arnaud, presented himself at the houses of the parties who had received copies of the prospectus. To complete his auditors' conviction of the excellence of his chemical candle-lamps, he held the wick to a flame, from which the said wick unquestionably suffered not the smallest damage.

The purchasers were numerous, to avoid immediate detection, he said the wicks must be soaked in oil for twenty-four hours, in which timo he had taken his departure for another district. The candles when tried were indeed found to be indisputable; the wick being made of asbestos, and the body of the candle of iron; but unluckily they did not fulfil the other condition for which they were recommended—they would not burn. Beccaris was at length apprehended, and sentenced by the tribunal of St. Mihiel to be imprisoned for three months.

Oram's Patent Fuel.—A correspondent at Calcutta informs us, that a trial of Oram's manufactured fuel has been made there with very dubious success. Some gentlemen, it is said, have given 1,000*l.* for the use of the patent in that country.

SECOND REPORT OF THE COMMITTEE APPOINTED BY THE LORDS OF THE TREASURY

RESPECTING RAILWAY COMMUNICATION BETWEEN LONDON, DUBLIN, EDINBURGH, AND GLASGOW.

The Report which contains the result of the labors of Lieut.-Colonel Smith, royal engineers, and Professor Barlow, was made in pursuance of orders from the Lords of the Treasury, and relates more particularly to that part of the projected line which is meant to communicate between London and Edinburgh, and London and Glasgow.

It appears, that by tho London and Birmingham, the Grand Junction, and the North Union lines, the communication by railway with Scotland is complete as far as Preston, being a distance of 218 miles 51 chains; and that the Prestou and Lancaster line is in a state of great forwardness, and that when this last-mentioned line shall be finished, the distance by railway from Loudon to Lancaster will he 233 miles 69 chains.

As an extension of time had been given by the Lords of the Treasury to the promoters of the lines north of the Carlisle and Newcastle Railways, the Report before us is necessarily confined to that part of the line which was meant to connect Lancaster with Carlisle.

It appears, that three projects, having for their end the extension of the great trunk line, were laid before the House, viz., one from Lancaster along the west coast of Cumberland, through Whitehaven to Maryport, in order to join the railway now in progress between the latter place and Carlisle; another from Lancaster, by Kirkby Lonsdale and the valley of the Lune to Penrith, and from thence to Carlisle; and a third from Lancaster to Kendal, and thence up the valley of Long Sleddale and by Hawes Water to Penrith, to form a junctiou with the proposed railway from the last-mentioned place to Carlisle.

The plan for the Cumherland coast line was prepared hy the engineers, Messrs. Rastrick and Hague, whilst Mr. Larmer furnished the Lune line, together with the estimates relating to it. The survey, as well as the gross estimate of the cost of the Kendal line, were prepared by Mr. Bentley, of Kendal.

The former project, which is conceived in a magnificent spirit, is sufficiently described in the following words:—

"It is proposed that this railway should commence at the terminus of the Lancaster and Preston railway, and that, curving round towards Skirton, it should first cross the Kendal Canal, and then the River Lune; the latter on a bridge, the arching of which is represented by Mr. Rastrick to he 660 yards in length, and of the extreme height of 67 feet above the hed of the river. From Skirton the line is to proceed by Torrisholme to the village of Poulton; from hence it would be carried in the direction of Leonard's Point, in the peninsula of Low Furness, on a lofty emhankment of 10 miles and 51 chains in length, to he constructed across the estuary of Morecambe Bay, into which the Kent, the Crake, and the Leven empty themselves. Through the peninsula the railway would have to be formed in a line of double curvature, and in some deep cuttings in sand-stone rock. It is also proposed to form an embankment across the Dudden Sands, from Ronhead Crag to Hodharrow Point, a distauce of one mile and 65 chains. These embankments are understood to hc the suggestions of Mr. Hague, whose plan provides locks and floodgates for the rivers, the channels of which he proposes to straighten and embank. It is here proper to state, that the promoters of this line calculate upon reclaiming by the two emhankments 52,000 acres of land, which they value at £23 per acre, and they have therefore taken credit for £1,196,000 in the estimate of this part of their project.

From Hodbarrow tho line would pass near Bootle to Ravenglass, through a country presenting no engineering work of difficulty or great expense until arriving at the river Esk, where a viaduct will he necessary of upwards of a quarter of a mile in length, and of 23 feet in extreme height, approached by an emhankment of about a mile in length, and of the average height of 15 feet.

The line is to curve at Ravenglass, passing the rivers Esk and Mitc, and to take a direction towards the coast, crossing the river Calder at its mouth. It is also to be carried over the river Ehen, and thence to keep along the shore, requiring the occasional formation of embankments, between high and low water mark, to the valley of St. Bees. Here a curve is proposed towards the north-east, to unite with one bending towards the north-west, which would bring the line, with tolerable easy work, to Whitehaven. It is proposed to carry the railway through the whole length of this town, on a series of arches, which Mr. Rastrick's plan shows to be of the extreme height of 27 feet, and of the length of half a mile. On leaviug Whitehaven a tunnel of 1,320 yards in length would have to be cut through sandstone. The line is from hence to pass towards Harrington, along the coast, through some short, but rather deep cuttings, and over four embankments, measuring altogether two miles in length, and of the respective heights of 18, 23, 27, and 34 feet.

Mr. Rastrick's plan is to cross the upper end of the harbour of Harrington by a bridge, which his section shows to be 120 yards long and 27 feet high.

From hence the line is intended to take the direction of Workington, and to cross the harbour, as well as the Derwent river, on bridges and embankments.

From the Derwent to the terminus of the Maryport Railway, with which Mr. Rastrick's line is proposed to be joined, the work will he easy.

The operations of an expensive, difficult, or objectionahle character on the coast line, which we have thus briefly described, are as follows:—

1. The bridge over the river Lune.
2. The embankments across Morecambe Bay and the Dudden Sands, with the embankments to confine the courses of the rivers which empty themselves into these estuaries.
3. The cuttings in rock through Low Furness.
4. The viaducts and embankments across the rivers Esk and Mite, and over the sands at Ravenglass.
5. The very extensive demolition of houses at Whitehaven, and the formation of a viaduct of half a mile iu length through that town.
6. The tunnel to the north of Whitehaven.
7. The crossing of Harrington harbour, and the injury which would therehy he caused to that port; and
8. The crossing of Workington harbour and the Derwent river.

To these may he added the stoppage of the Ulverstone trade during the formation of the river channels, and a part of the Morecambe Bay embankment.

Although each of these operations would be attended with considerable expense, none of them presents what may be termed great engineering difficulties, excepting the embankments of Morecambe Bay and the Dudden Sands; but these are works of an extraordinary character and magnitude, and therefore require our particular notice.

The formation of an embankment of upwards of 10 miles in length across an estuary where the sea has been known to rise 30 feet, aud where in gales from the north-west to the south-west it rolls in with tremendous force, and with a rate of tide during the springs of more than four knots an hour, may justly he termed a project of a gigantic character, and will, if executed, reflect much credit on the engineer.

Of the probahle expense of these enormous works it is very difficult to form any opinion, inasmuch as the proverbial inaccuracy of engineers' reports in matters of pecuniary outlay is here more than usually conspicuous, and numerous discrepancies appear on the face of the report itself; nor is it the opinion of the committee that sufficient allowance is made for those frictions and casualties that always arise during the progress of any work of similar magnitude.

Independently of the question of expense, it would appear by this report that many other grave objections exist to the eligibility of the coast line as compared with the inland ones. These may shortly he stated to consist in the greater expense to the public in travelling on the coast line than on those more inland, and on the extreme hazard that so expensive an operation would not afford any remuneration to its proprietors.

To enable the reader to understand the particular nature of the objections which, in the minds of the committee, appear to weigh so heavily against the adoption of the coast line when compared with that of the Lune or the Kendal line, it will he necessary to refer to their respective mechanical properties.

It appears that the length of railway to he executed on the coast line between the terminus of the Preston and Lancaster Railway at Lancaster and the Maryport Railway, amounts to 66 miles 42 chains, and that the length of the Maryport and Carlisle Railway, which is now in progress, is 28 miles 7 chains, making the whole distance hetween Lancaster and Carlisle 94 miles 45 chains, the gradients being of a favorahle description.

By the inland line of the valley of the Lune, Orton, and Penrith, the whole distance hetween Lancaster and Carlisle is 68 miles 48 chains, but the gradients are less favorahle than those of the coast line.

By tho other inland line *viâ* Kendal, tha distance between the termini at the Lancaster and Carlisle, is only 64 miles 34 chains; hut as this line unites Lancaster on a different level from the terminus of the Preston and Lancaster Railway, it does not form a junction with that line till it has passed 2 miles 54 chains farther on towards Preston, so that the whole length of the new liue to he executed on this route will amount to 67 miles 8 chains, the gradient heing somewhat less favorable than on the line of the Lune.

In order to make a comparison of the mechanical advantages and disadvantages of these lines, Colonel Smith reduced the several gradients to equivalent horizontal distances. After stating the principle on which these calculations were made, and applying them to the several gradients on each of the three lines under consideration, the report states the following conclusions: viz.—

The locomotive power requisite to work the coast line of 94 miles and 54 chains, with a gross load of 50 tons, is equivalent to that which would work a horizontal line of 98 miles 34 chains; while the mean equivalent distance for the inland line of the valley of the Lune is 78 miles 1 chain, and for the Kendal line between Lancaster and Carlisle, 75 miles 9 chains. As far, therefore, as regards the expense of locomotive power, the advantage is much in favor of either of the inland lines, as compared with the coast line, while all the other expenses are still more in their favor, these latter expenses heing generally proportional to the actual distance, such as police, stations, water stations, road repairs, Government taxes, &c.

In order to ascertain the effect that this increased locomotive expense would have on the general working expenses of the several lines, we have examined with great care and attention the official returns of the principal working railways, separating, as far as possible, the charges for locomotive power from the other charges; and although we have found considerable differences in the proportions, according to the prices of fuel and other circumstances; yet, upon the whole, it appears to be a fair average to assume the locomotive expenses as amounting to one-third, or about 33 per cent., of the total working expenses of a line of railway of moderate traffic; and since the equivalent distance on the inland lines is about one-sixth greater than the actual distance, the additional locomotive charge due to the gradients will amount to about one eighteenth, or six per cent. on the general expenses of the line; or estimating, as is usually done, the total expenses

at half the income, to about 3 per cent. on the latter; which, if borne by the traveller, would have the effect of increasing his fare about 4d., on either the Kendal or Lune line, assuming the fare under ordinary circumstances at 2d. per mile. At this rate of charge, and making the addition of 4d. on the inland lines, the fare for the journey between Lancaster and Carlisle would be—

	s.	d.
By the coast line	15	9
By the Lune line	11	7
By the Kendal line	10	11

In respect of time, estimating the speed, including stoppages, at $22\frac{1}{2}$ miles per hour on the equivalent distances on the three lines, we find it to amount—

	h.	m.
By the coast line to	4	22
By the Lune line	3	28
By the Kendal line	3	20

It appears, therefore, notwithstanding the mechanical disadvantages of the gradients on the inland lines, as compared with those on the coast line, that the expense to the traveller, as well as the time of performing the journey, would be considerably greater on the latter line than on either of the former.

The report then proceeds to examine at great length the comparative claims of the three lines as regards the amount of population and present traffic, and, having decided against the coast line, proceeds to examine the two inland lines. The line in favor of which it decides is thus described:—

A description of the intended road from Penrith to Carlisle, which is common to both projects, offers little field for observation, as it contains nothing of any particular interest, or out of the usual way. We shall therefore proceed to point out the course of the lines which are to form a junction with the Penrith Railway, and shall begin with the project of the valley of the Lune, starting from Lancaster.

It is intended that the terminus should be that of the Lancaster and Preston Railway, and that the line should be carried in the direction of Kirkby Lonsdale, at a few miles to the westward of Sedbergh; thence by Borrow-bridge and Orton, and through Crosby, Ravensworth, Newby, Melkenthorp, and Clifton, to Penrith.

Between Lancaster and Kirkby Lonsdale the prominent features of this line are, first, the crossing of the river Lune at the Crook, on a bridge of 60 feet in height, and consisting of three arches of 50 feet span; then short cuttings in gravel of 65 feet, and 50 feet in depth; and near Kirkby Lonsdale a cutting of a quarter of a mile in length, and of the extreme depth of 67 feet, in limestone.

From this spot to nearly opposite to Sedbergh the only engineering work requiring notice is the crossing of the Lune twice in the short distance of 15 chains.

At Barrow-bridge the Lune would have to be crossed on a bridge of about 48 feet in height, consisting of one arch of 60 feet span; and here an embankment of nearly half a mile in length, and of the mean height of 20 feet, would also be necessary. From hence to Orton the points deserving of remark are, the formation at Tebay of an embankment of half a mile in length and about 35 feet in height, and the crossing the Lune on a bridge of 54 feet in height and about 200 feet in length.

From Tebay the line rises at the rate of 1 in 132, for upwards of three miles, to Orton Scar—the proposed summit, which is 650 feet above the Lancaster terminus.

In approaching this summit, where a tunnel of about one mile and 30 chains would be requisite, there would be a cutting in rock of rather more than a mile and a half in length, and averaging 48 feet in depth; the extreme depth being 84 feet. On the northern side of the tunnel another cutting in the same material would occur of about half a mile in length, averaging 36 feet, and of the extreme depth of 75 feet.

These two cuttings and the tunnel, which are in red sandstone and limestone, would be the heaviest and most expensive operations on this line.

The extreme height of the hill above the tunnel is shown in Mr. Larmer's section as being 322 feet; and this has been found to be correct by a survey to which we shall heareafter more particularly allude.

Between the northern end of the tunnel and Crosby Ravensworth the railway would keep in the valley, in which Mr. Larmer proposes to cross a mountain stream two or three times. For this purpose bridges would be necessary; but it is thought that it would be better to change the course of the stream, and to form a proper embankment for the railway, to keep it clear of the water during floods.

At Crosby Ravensworth a bridge 44 feet high, and at Maulds Meaburn another 50 feet high, would be necessary over two streams; an embankment would likewise be required at the latter place. At Morland bank there would be an embankment of half a mile in length, and of the extreme height of 55 feet.

Between Newby and Melkenthorp a cutting in limestone, of a mile in length, and of the extreme depth of 28 feet, would be required. At the last-named place the Leathe would have to be passed, on a bridge of 66 feet in height, with an arch of 50 feet span, approached by considerable embankments.

At Clifton there must be a cutting in sand, of about a quarter of a mile in length, and averaging 30 feet in depth.

Between Clifton and Penrith the rivers Lowther and Eamont would have to be crossed on bridges of 62 feet in height and 200 yards in length.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING JANUARY 4, 1841.

Monday,	Entomological Society	8	P.M.
Tuesday,	Uranian Society	8	P.M.
Wednesday,	Geological Society	8½	P.M.
Thursday,	Royal Society	8½	P.M.
	Zoological Society	3	P.M.
Friday,	Astronomical Society	8	P.M.
Saturday,	Westminster Medical Society	8	P.M.
	Mathematical Society	8	P.M.

(N.B.—This being Christmas week the Societies did not hold their Meetings.)

MICROSCOPICAL SOCIETY.

Dec. 23. *George Loddiges, Esq., F.L.S., in the Chair.*

A paper was read by Mr. Leonard, "On the elegant form and curious structure of a new species of Navicula." This species was found near Cartel del Piano, in Italy. The beautiful drawings exhibited were made by Mr. L. for the forthcoming translation of Dr. Ehrenberg's work, to be published by Mr. Pritchard.*

The species referred to was found also in a fossil state in some finely pulverized matter lately brought from the Upper Bann (a river in Ireland). Mr. L. observed in it precisely the same form, but not much more than half the size, and in general the specimens were not so perfect.

The matter which contains this new and elegant fossil is a fine white siliceous powder, found near Cartel del Piano, in Italy. It gathers into little tufts, or balls, not much larger than pins' heads, and easily adhering together. This is occasioned by multitudes of fine needle-shaped shells, with a kind of arrow-head at each end. The splendid animalcule, the *Navicula* (of which a model, made in paper, exhibited Mr. L.'s idea as to its formation and structure, but which, to have been correct, ought to have been constructed of glass), is of superior size. The elegance of its form, its beautifully undulating outline, and extreme transparency, render it a very pleasing object under the microscope. It is about the fiftieth part of an inch in length, and the proportion of length and width is nearly as five and a half to one: a good quarter of an inch object glass shows it to great advantage.

The top and bottom of the animalcule are alike, and the sides are either seldom to be met with in connection with the top and bottom, or they are so transparent as not to be easily discerned. The cross *striæ* form the interesting feature in this animalcule, which in some species of *Navicula* are considered as mere markings on the surface of the shell, but Mr. Leonard's opinion is that they are not.

Mr. Leonard considers these lever-like, or tooth-like processes, projecting from either side, and not quite meeting in the centre, as articulated protuberances, whose functions are to produce a current, and to grasp or press its food, in order to serve as its support.

Mr. Edwards could not, however, conceive how Mr. Leonard looked upon these furrows on the *Navicula* as "articulated protuberances." In his opinion it is clearly proved that the markings on the siliceous shell of this animalcule are simple furrows, and that the whole is a flat object. He stated that Ehrenberg had subjected them to the heat of a furnace (even in recent specimens), and found that no effect whatever was produced on their being again subjected to microscopic power. Mr. E. also conceived, that had they been jointed, as Mr. Leonard supposes, that heat would have destroyed any animal matter which must have bound them together.

Mr. Bowerbank fully coincided with the opinion expressed by Mr. Edwards. He had observed them under the most favorable circumstances for years, in both the living and fossil state, and has never observed motion of any kind in the so-called teeth. With Mr. Powell's sixteenth-of-an-inch object glass, in addition to the structure ordinarily and hitherto observed, he detected small protuberances of a roundish form attached on either side of the lines. Mr. B. denied altogether that these markings were detached from the shell.

Mr. Cornelius Varley, a gentleman of much experience in these matters, was also of the opinion expressed by Mr. Edwards and Mr. Bowerbank. He had boiled these animalcules in strong nitric acid, and found that the markings still remained; indeed the appearance of the object was much improved by thus treating it, as the acid entirely removed all the animal matter.

Many gentlemen attended with their microscopes.

ROYAL SOCIETY OF EDINBURGH.

At the meeting on Monday last there were four communications. 1. On the polarisation of the chemical rays of light, by Dr. Sutherland. In his paper a detailed account was given of experiments, showing that the invisible rays of light which manifest their existence by chemical action, are subject to polarisation like the luminous rays. The photogenic paper, and still more, the Daguerreotype plates, have afforded new methods of demonstrating this property, and settling the controversies which have hitherto existed on the subject. 2. On the nutrition of vegetables, by Dr. Madden. The author contended against the opinions of Liebig and others, that plants, like animals, select different species of food, and that manures do not operate in the simple and universal way which the German chemist asserts. 3. On the Fossil Fishes of the old red sandstone of Orkney, by Dr. Traill. The author had found a considerable variety of fossil fishes in Orkney, dispersed over a line of thirty-five miles in length. They agree generically with those found in Caithness and elsewhere, but afford some new species, and, among others, one which has been named Diplopterus Agassiz, after the eminent Swiss naturalist, who had examined all the specimens when recently in Edinburgh. A number of specimens from Cromarty, collected by

* We beg to state that Dr. W. H. Willshire (who is now travelling in Morocco) translated this work; it was arranged entirely under his superintendance.

Mr. Miller, were also laid upon the table. 4. Mr. Milne described various instruments, prepared by a committee of the British Association, for registering the shocks of earthquakes. These were of various kinds,—some for registering vertical movements, some for lateral, many of them new, others borrowed from foreign countries. In connection with this subject, Sir John Robison supplied the following graphic note from Colonel Gordon, now in Corfu, about the late earthquake in Zante :—

"Zante has been visited by a dreadful earthquake, which fortunately occurred in the middle of the day,—not more than five or six lives have been lost. The Lord High Commissioner was within six miles of the shore, and he imagined the boiler of the steamer had burst. The guard of honor was awaiting him ashore, when a fragment of rock alighted on the bass drum and crushed it to pieces, without hurting the drummer—the old guard was passing through a sally-port when the arch fell in, and buried the muskets of the two last men. The adjutant of the 38th was precipitated 40 feet, and has dislocated his shoulder. The families who had boxes at the opera are living in them, and the wife of an officer of engineers is living in their coach-house. The buildings which had their foundation on limestone escaped pretty well, except one village, which was turned topsy-turvy, the strata underneath showing itself betwixt the lime formation to be full of large veins of mud."

SCIENTIFIC MEMORANDA, AND NOTES ON ART.

Currents of the Mediterranean.—Some years ago Captain Smyth, having procured specimens of sea-water at different depths from the Straits of Gibraltar, submitted them to Dr. Wollaston, who examined them, and published the result of his experiments in the *Philos. Trans.* 1829, Part I. From these he concluded that there is a current setting into the Straits, and an under-current setting out to the Atlantic. Mr. Lyell, without referring to Ray, offers some objections to this opinion. But if he had quoted the 'Physico-Theological Discourses,' we should have been supplied with a full discussion of the interesting topic; for says Ray, "I do not understand how waters can run backward and forward in the same channel at the same time. For there being but one declivity, this is as much as to affirm that a heavy body should ascend. It is making rivers ascend to their fountains, affirming that to be done which all the world hath hitherto looked upon as impossible." Ray was also well aware of the arguments adduced in favor of an under-current at the Propontis and the Baltic Sound, which he likewise discusses at great length, and with great ability. "M. Marsilly," he observes, "affirms that the lower water in the channel of the Thracian Bosphorus is driven northward into the Euxine Sea, while the upper flows constantly from the Euxine southward, and that that which flows from the south is salter and heavier; which he found by letting down a vessel close shut up, fitted with a valve to open at pleasure, and let in the lowest water, which being brought up and weighed, was found to be ten grains heavier than the upper. That the upper and lower flow contrary ways he found by the fishermen's nets, which, being let down deep from vessels that were fixed, were always, by the observation of the fishermen, by the force of the current driven towards the Black Sea; and by the letting down of a plummet, for if it were stopped and detained at about five or six feet depth, it did always incline towards the Marmora or Propontis." It is obvious that Dr. Wollaston must have been unacquainted with these facts, otherwise he would not have considered it necessary to submit a paper to the Royal Society, the contents of which had been so obviously anticipated by upwards of a century; the three localities alluded to being so analogous, that Ray applies the same reasoning to them all.—*Athenæum.*

Mode of Increasing Potatoe Crops.—M. Zeller, Director of the Agricultural Society of Darmstadt, in 1839 planted two plots of ground, of the same size, with potatoes: when the plants had flowered, the blossoms were removed from those in one field, while those in the other field were left untouched. The former produced 476 lb., the latter only 37 lb.

Bones of Elephants, &c., in France.—MM. Riviere and Briggs have discovered some elephant bones between Joinville le Pont and Champigny. They are placed in sand, which presents the following section;—vegetable earth and alluvium, diluvial flinty deposit, diluvial sand, and, lastly, sand very rich in fossil bones, and is superior to that of the Marne and Seine. Gaultier de Claubry states, also, that a vertebra of the Paleotherium, and some remains of a crocodile and fishes, have been discovered in the coal-field of Bert, in the department of Allier.

Lactic Acid, Acid of Milk.—This acid, although at first formed from milk by Scheele, has been since the time of that chemist obtained from various bodies. Some sources from which it has been procured by Fremy, are closely connected with fermentation. He finds that all animal substances which have the property of acting as ferments, acquire the power of transforming into lactic acid, not only sugar, but also dextrine, gums, and starch, &c. The action of these animal substances is destroyed when they are exposed to the temperature of 212 deg. It is probable that the study of these gradual changes may throw light upon the formation of acids in vegetation. If we take barley which has germinated, moisten it, and preserve it for three or four days in a closed flask, the animal matter which exists to a small extent in barley, under the conditions described, is modified, and the temperature rises. If it now be placed in water at the temperature of 104 deg. for two or three days, the water becomes strongly acid, and contains very considerable quantities of lactic acid. It would appear that in this case the diastase changes the starch into dextrine and sugar, which are immediately converted by the influence of animal matter into lactic acid.

Effects of Tobacco on Man.—In *small doses*, tobacco causes a sense of heat in the throat, and sometimes a feeling of warmth at the stomach; these effects, however, are less obvious when the remedy is taken in a liquid form, and largely diluted. By repetition it usually operates as a diuretic, and less frequently as a laxative. In *larger doses* it provokes nausea, vomiting, and purging. Though it seldom gives rise to abdominal pain, it produces a most distressing sensation of sinking at the pit of the stomach. It occasionally acts as an anodyne, or more rarely promotes sleep. But its most remarkable effects are languor, feebleness, relaxation of muscles, trembling of the limbs, great anxiety, and tendency to faint. Vision is frequently enfeebled; the ideas confused; the pulse small and weak; the respiration somewhat laborious; the surface cold and clammy, or bathed in a cold sweat; and in extreme cases, convulsive movements are observed. In *excessive doses*, the effects are of the same kind, but more violent in degree. *Snuff.*—Lanzoni states that an individual fell into a state of somnolency, and died lethargic on the 12th day, in consequence of taking too much snuff. The habitual use of this substance blunts the sense of smell and alters the tone of the voice; but I am unacquainted with any other well-ascertained effects, though Cullen ascribes loss of appetite and dyspepsia to it. I have known several inveterate snuff-takers, who, after many years' use of this substance, have discontinued it with impunity; but Dr. Cullen thinks, that when the discharge of mucus is considerable, the ceasing or suppression of it, by abstaining from snuff, is ready to occasion the very disorders of head-ache, tooth-ache, and ophthalmia, which it had formerly relieved. The *smoking* of tobacco by those unaccustomed to it, gives rise to all the before-described effects of large and excessive doses. A very interesting case, which had almost terminated fatally, is related by Dr. Marshall Hall. It was that of a young man, who, for his first essay, smoked two pipes. Gmelin mentions two cases of death from smoking, in the one of seventeen, in the other of eighteen, pipes at a sitting. In *habitual smokers* the practice, when employed moderately, provokes thirst, increases the secretion of saliva and buccal mucus, and produces a remarkable soothing and tranquillising effect on the mind, which has made it so much admired and adopted by all classes of society, and by all nations, civilised and barbarous. The practice of *chewing* tobacco is principally confined to sailors, and is less frequently submitted to our observation, so that we are not so competent to speak of its effects, which probably are similar to those caused by smoking. The application of *tobacco to abraded surfaces* is a very dangerous practice, and has in some instances been attended with violent or even fatal results. Mr. Weston has related a case, in which the expressed juice of tobacco was applied to the head of a boy, aged 8 years, for the cure of *tinea capitis.* —Death took place 3½ hours after the application.—*Pereira's Materia Medica, Part II.*, 1840.

Encouragement for Civil Engineers at the Durham University.—The Dean of Durham having placed the two scholarships in his nomination to be given by the University to such students as had distinguished themselves at the last examinations of students in arts and students in civil engineering, the scholarships have been assigned to William Haslam, student in arts, and to Samuel Smith, student in civil engineering, at the recommendation of the examiners. The prize of five guineas, offered for the best English Essay, to be written by any student in civil engineering, "On the best method of constructing a harbour, pointing out the difficulties likely to arise in different localities, and the fittest means of surmounting them," is assigned to John Wallace, engineer student. W. L. Wharton, Esq., has proposed a prize of five guineas for the best report upon a subject proposed to be made by any engineer student; the report to be sent to the professor of mathematics on or before the 30th of April, 1841.

VARIETIES.

Statistics of Great Britain.—In Great Britain the number of persons in a state to bear arms, from the age of 16 to 60, is 2,744,847. The number of marriages is about 98,030 yearly; and it has been reckoned that in 63 of these unions there were only 3 which had no issue. The number of deaths is about 332,700 yearly, which makes nearly 25,592 monthly, 6,398 weekly, 914 daily, and 40 hourly. The deaths among the women are, in proportion to the men, as 50 to 54. The married women live longer than those who continue in celibacy. In the country the mean term of the number of children produced by each marriage is 4; in towns the proportion is 7 for every 2 marriages. The number of married women is to the general number of individuals of the sex as 1 to 3; and the number of married men to that of all the individuals of the male sex as 3 to 5. The number of widows is to that of widowers as 3 to 1; but the number of widows who marry again is to that of widowers in the same case as 7 to 4. The individuals who inhabit elevated situations live longer than those who reside in less elevated places. The half of the individuals die before attaining the age of 17 years. The number of twins is to that of ordinary births as 1 to 65. According to calculations, founded upon the bills of mortality, one individual only in 3,126 attains the age of 100 years. The number of births of the male sex is to that of the female sex as 96 to 95.—*Edinburgh Philosophical Journal.*

Cape Wool.—The rapid progress of the Cape colony in the growth of this important article may be judged of by comparing the *export* of it in 1816 with the present export; and the *prices* of Cape Wools with those of the Australian. In 1816 the export was 9,000lbs.; in 1838 above 420,000; and in 1839, 552,690lbs.—and in the current year the arrivals are proportionately more abundant. As to prices the lowest are from 6d to 8½d (in grease),—the highest from 1s. 7d. to 1s. 10½d., and the general testimony in favour of the improvement of the wool is in quality. The prices of the New South Wales Wool range from 7d. to 2s. 2½d., the Swan River from 1s. 3d. to 1s. 4½d., the South Australian from 8d. to 1s. 3d. —*African Colonizer.*

Coal in India.—A friend, residing in India, informs us, that a mine of very superior coal has just been discovered by an officer in the East India Company's service, about seventy miles south of Chunar.

Commerce of Russia.—From the official returns of the foreign commerce of Russia for 1839 it appears that the exports amounted to 341,898,679 bank roubles, being an increase of 28,372,992 R. on those of 1838. The imports were 249,152,476 R. Thus the exports have exceeded the imports by 92,746,203 R., showing greater prosperity than in former years. The importation of gold and silver, partly in coin and partly in ingots, amounted to 65,752,741 paper roubles. The principal articles of export were corn to the value of 88,259,596 R., hemp 3,571,768 puds, flax 22,348,260 puds, tar 3,994,296 puds, iron 1,073,908 puds, raw and tanned leather, 8,715,882 puds. The chief articles of import were raw and spun cotton 800,649 puds, dyeing materials 20,947,480 roubles, sugars 1,594,207 puds, wines 20,288,829 roubles, silk, cotton, and linen manufactures to the amount of 38,708,977 roubles

A new Comet.—The year 1840 is remarkable for the number of comets which it has shown us. The appearance of another is announced to us by M. Bremicher, an astronomer of Berlin, who saw the new luminary on the 27th of October; and in the observatory at Paris, the clever astronomer M. Langier observed this telescopic comet on the 7th of November, in the group of the Dragon. This is the fourth comet which has appeared in the space of 14 months. It emits but a very feeble light, but its diameter, which exceeds two minutes, announces very uncommon dimensions. This comet is entirely telescopic and quite invisible to the naked eye. It is extremely difficult to discern it even with an excellent night-glass.

Lemonade.—Was first introduced as a beverage in putrid diseases by the French physicians in the beginning of the seventeenth century; and about the year 1660, an Italian from Florence, having learnt a process of freezing confectionary, conceived the happy idea of converting such beverage into ice. This found a ready sale, and was the occasion of so great an increase in the number of sellers of lemonade, that in the year 1676 the *lemonadiers* of Paris were formed into a company, and received a patent from the government. —*Dr. Paris's Pharmacologia.*

Coal Mining Extraordinary.—In March, 1836, seven men commenced sinking two coal-pits at Wood Park, between Ashton-under-Lyne and Oldham, belonging to Messrs. Lees and Co.; and on Thursday week they completed their work. The depth of one shaft is 378 yards 6 inches, and of the other, 365 yards 2 feet 6 inches. Six out of the seven men have worked the whole time in sinking. They have cut through ten beds of coal, and one of cannel; and, when at the depth of 180 yards, they stopped upwards of 3,000 gallons of water per hour, without lessening the diameters of the pits, which are ten feet each for the whole depth. The men have had the good fortune to finish their work without a single accident. On Monday week, the proprietors of the colliery gave the sinkers a very handsome present.

Preservation of Magna Charta.—Sir R. Cotton, while collecting his literary treasures, being one day at his tailor's, discovered that the man held in his hand, ready to be cut up for measures, the original Magna Charta, with all its appendages of seals and signatures. He bought this singular curiosity for a trifle, and recovered in this manner what had long been given up for lost.—*Note to Pepys' Journal.*

Perfection of Naval Gunnery.—Two captains of merchant vessels, who have lately arrived from Beyrout, have thrown an interesting light on the effect of British broadsides. They say, that in some places where they were directed to bring down walls and towers by firing at the base, and "knocking" the legs from under them, the entire broadsides was thrown into a circle of five feet diameter, as if they had all struck a target with one accord. They assure us that the five feet holes below, and the toppling towers above, are the most striking sights they ever beheld.—*Times' Correspondent.*

Coal-pit Accident.—On Friday afternoon part of the shank of a coal-pit near Dalmarnock fell in, and enclosed four men who were at the time engaged at their work. Every exertion had been made for their release, but up to this morning (Monday), in consequence of another fall of earth and stone retarding the operations of the excavators, none of them had been got out. We have been informed that, before the second fall took place, the workers could hear the men on the other side, consequently there is some hope that they may be all got out alive.—*Glasgow Reformer.*

Travelled News.—There appeared in the *Inventors' Advocate* about two months since a paragraph, translated from a French paper, mentioning some attempts made by the French discovery ships to sound the depth of the sea in the Pacific Ocean. This paragraph was copied without acknowledgment into the London and provincial papers; it crossed the Atlantic; made the progress of the United States; came back to England in the recent arrivals of American papers; and has been from thence transferred, as of American origin, into the *Times*; and is now making a second tour through the English provinces.

Temperature at St. Petersburgh.—The cold which set in on the 9th of last month continued at St. Petersburgh on the 15th with great severity. The thermometer of Reaumer was every day from 20 deg. to 22 deg. below zero, 45 deg. to 49½ deg. below freezing point, or 13 deg. to 17½ deg. below zero by Fahrenheit's scale.

The Theatres.—This week novelty of the strangest kind has been the order of the season. Christmas might as well be without its pudding as its pantomime; therefore there have been cooked up at most of the theatres dishes as attractive to the eyes of the holiday folks as ever were presented to their wondering visions. Covent Garden has laid the *Castle of Otranto* under contribution for the entertainment of the crowds who nightly pour in, till the theatre overflows. It is a good laughter-stirring exhibition, at which Science herself may relax and laugh. The Adelphi has caught *The Enchanted Fish*, and angles with it to good purpose; as the nightly crush into boxes, pit, and gallery testifies. This theatre is always particularly successful in the harlequinade part of its pantomimes, and the *Enchanted Fish* is not less so than usual. *Jack of Newbury* is made to figure as Harlequin at the Victoria. The Haymarket, which is devoted strictly to the "legitimate drama," scorns to avail itself even of Christmas time to let Harlequin and Columbine jump upon its boards. *Tom Thumb* is the substitute, and surely, if any character of the drama can be an efficient substitute for Harlequin, *Tom Thumb* is the man.

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Mining Journal Office, 37, New Broad-street, City, 27th June, 1840.

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THE DEVELOPMENT OF ELECTRICITY FROM STEAM.

Some additional experiments by Mr. Armstrong, on the electricity of effluent steam, accounts of which are given in the *Philosophical Magazine*, for the present month, afford confirmation to the correctness of the explanation which we offered of the cause of this curious phenomenon.* We are glad to perceive that Mr. Armstrong takes, to a certain extent at least, the same views of the phenomenon as ourselves, though he involves his explanation in considerable, and, in our opinion, useless complexity. In Mr. Armstrong's first experiments, he did not succeed in developing negative electricity; but this could no more be expected without insulating the boiler, than that negative electricity could be excited from an electrical machine without insulating the rubber. His later experiments have been made with an insulated boiler, and the result was that negative electricity was developed with even greater facility than the positive electricity can be obtained from the effluent steam.

The boiler having been insulated, by raising it upon blocks of baked wood, it was found that the escape of steam, of all degrees of pressure, produced powerful indications of negative electricity from the boiler, even when no traces of it could be detected by placing the conductor in the jet of steam. According to the view we took of the cause of the phenomena, this result might have been anticipated.

It will be recollected that we assumed, as the basis of our hypothesis, the Franklinian theory; that there is only one electric fluid, and that the developments of electricity depend upon the disturbance of the natural electrical equilibrium. We are aware that this simple theory has of late grown rather into disrepute, and that the old and complex theory of two distinct electric fluids has gained ground. We are, however, strong adherents to the theory of Franklin, which explains, in our opinion, all the phenomena of electricity as satisfactorily, and much more simply, than the retrograde notion of resinous and vitreous fluids.

The capacity of bodies for electricity is found to vary by any change which produces an enlargement or contraction of their volume. The rule is, that expansion increases the capacity of bodies for electricity, and contraction diminishes it. When, therefore, any substance which contains its natural quantity of electricity, in relation to surrounding bodies, is compressed into a smaller volume, the fluid is in excess and a quantity of positive electricity is evolved. If the compression or contraction be sudden, and the surrounding bodies be bad conductors, the quantity of electricity evolved will remain some time in excess; and may be indicated by the electrometer. When the change is gradual, or takes place in connection with good conductors, the electrical equilibrium becomes restored nearly as quickly as it is disturbed; and though the electrical action may, in reality, be great, it is not perceptible by any instrument at present invented.

Proceeding, then, upon this intelligible theory, the new experiments of Mr. Armstrong may be fully explained.

Every escape of steam from a boiler disturbs the electrical equilibrium, because the expansion of the vapor gives it a greater capacity for electricity than it possessed in its compressed state within the boiler. The vapor abstracts the electric fluid from all surrounding conducting bodies, and until it has obtained the quantity for which its increased volume gives it additional capacity, it must remain in a negative state. The boiler, from which the principal supply must be derived, becomes consequently deprived of a portion of the electricity it previously possessed. Supposing, therefore, the boiler to be insulated, and the escaping steam to continue in a state of vapor, there would be a development *in both* of negative electricity; and both would attract the electric fluid from any conducting body brought near them. This we find to be the case with the boiler. The escape of steam from it is instantly followed by a development of negative electricity, and indications of the same electrical state would be manifest in the escaped steam were it not condensed almost as quickly as it expands. The expansion of the same weight of steam, it may be supposed, whether in a state of high or low pressure, would absorb equal amounts of electricity; and this, so far as can be ascertained, is confirmed by the results of Mr. Armstrong's experiments. An insulated boiler therefore affords the means of keeping up a constant excitement of electricity. The experiments hitherto made with the escaping steam, on the contrary, afford very different indications of electricity in proportion to the tension of the steam. With steam of low pressure scarcely any indications of electricity are obtained; it is only when the jet rushes out with great velocity, that the effects become most apparent. The quantity of positive electricity to be obtained from the escaping steam is, we conceive, fully equal to the negative electricity exhibited by the insulated boiler; and that in every state of pressure the same weight of steam gives out an equal quantity of the electric fluid. The difference may be attributed to the difficulty of collecting the electricity contained in a large volume of steam, and to the imperfect manner in which the experiments have been conducted, owing to the erroneous notions entertained of the source of the electricity.

Mr. Armstrong and Mr. Pattinson supposed that in their experiments positive electricity is contained in the effluent steam as vapor, therefore they formed their conductors in the manner they would have done had they intended to attract electricity from a known reservoir of the electric fluid. The points they fixed to the end of their conductors were, indeed, found to be of but little use, nor could they be, if we consider the cause of the development of positive electricity from the effluent steam, as explained in our preceding article on this subject. We there stated that the development of positive electricity is to be attributed to the *condensation of the steam into water*. That the electricity which the vapor absorbs from the boiler in its expansion is liberated the instant that it becomes condensed, and a quantity of free positive electricity is thus evolved. In order, therefore, to obtain positive electricity from effluent steam it must first be condensed. Proceeding upon this principle, the kind of conductors that ought to be employed should be those that would most readily condense the jet of steam. The larger and colder the surface, the greater ought to be the quantity of electricity evolved. We would suggest, indeed, to these indefatigable experimenters on this subject, that they try the effect of admitting the jet of steam from an insulated boiler through a glass tube, into a large insulated condenser. In such an arrangement, we conceive, the development of positive electricity in the condenser would be much greater than the quantity that can be collected from the jet of steam escaping into the air. We should thus have a perfect electrical vapour machine.

* Inventors' Advocate, No. 73.

We conceive it possible that the means of exciting electricity by some arrangement such as that now proposed, may be found available in many instances, with small insulated digesters, as a substitute for the electrical machine, or the voltaic battery. The large quantities of electricity developed in the experiments by Mr. Armstrong and Mr. Pattinson, with, necessarily, very imperfect apparatus for the purpose, renders it feasible to suppose that by other and more perfect adaptations, a quantity, at least equally large, may be procured by much smaller boilers. We also recommend those gentlemen, who possess such great facilities for these experiments on the large scale, to try the effect of the electrical current, between the insulated boiler and the effluent steam, in magnetizing iron. Should it be found that the current of electricity, passed through the copper-wire helix of an electro-magnet, communicates magnetic attraction, there would thus be opened a new field of research in that interesting branch of scientific discovery, that might lead to important consequences in the application of electro-magnetism as a moving power.

MODE OF ASSAYING COPPER BY ELECTRO-CHEMICAL ACTION.

A new and very simple method of assaying copper ores has been applied by Mr. R. W. Byers, of Tremadoc, near Carnarvon, a description of which he has communicated to the *Mining Journal* The principle of the process is shortly this. He dissolves the ore in an acid, and afterwards decomposes the solution by electro-chemical action. The copper precipitated on the metal employed to excite the electrical current, represents the exact quantity contained in the ore, and that is ascertained by weighing the metal before and after the experiment. Mr. Byers has practised the process for two years, and with invariable success. His communication is too valuable not to be given in his own words, so far as relates to the mode of conducting the operation.

" *Process.*—A given weight of the ore (as prepared for assaying by the dry way) is dissolved in an acid (*aqua regia* is the best), evaporated nearly to dryness; redissolved in water, filtered, and then treated as the copper solution, I shall describe a little further on. I may remark, I have precipitated the copper on gold and platinum, and adopted various forms, particularly the helix, which I used more than two years, but I find copper cylinders answer better, and there is little trouble in cleaning them, compared with the more precious metals. I feel warranted in saying I have tried hundreds of samples, and have never been deceived by the process—that cannot err; but error may arise from not having a perfect solution, and in the manipulation of the ore, before it is subject to the electro-chemical action.

" Now for the demonstration, and which is a beautiful proof of the correctness of the atomic theory:—Take 250 grs. of the crystallised bipersulphate of copper (or half the quantity), which contains 64 grs. exactly of pure copper, dissolve it perfectly, add two or three drops of acid, and place it in an unglazed earthen pot, which will hold three fluid ounces; place this in another somewhat larger, glazed, in which there is a weak solution of hydro-chloric acid; introduce a copper cylinder (to which a wire is soldered, and whose exact weight is known) in the copper water, and an iron cylinder (with a wire attached in the same manner) in the outer vessel of acid and water; amalgamate the ends of the wires with nitrate of mercury, and connect them in a cup of the same metal, or in any way, so that they are in perfect contact. As soon as the circuit is perfected, the operation will commence (and which may be known by a slight hissing sound), and will not cease until all the copper is precipitated on the copper cylinder, and which may be effected in the space of from ten to twelve hours; then take out the cylinder, dip it in water, dry and weigh it—its increase in weight will be the per-centage of the copper, and, in this case (for half the quantity), it will be 32grs. heavier than it was before. The operation, when completed, can be known by taking one drop out of the solution and placing it on pure gold, or platinum, and touching it with a zinc rod—if no copper be precipitated on the gold, the solution will be free from copper. Thus, then, may every one interested in the produce of copper know the exact per-centage of an ore, according to the sample. By the dry assay there is considerable loss, and which I have proved by " check samples," on many occasions varying from one eighth to six-eighths per cent., and yet the miner must sell by the dry assay; and any one connected with the sale of ore knows (especially in those of low produce) what a difference one-half per cent. makes in the price. Get some old pots from an assay-office, and test them, or try the slags after the " prill" of copper has been extracted—in both copper can be traced. A word on these Cornish pots (although the best of crucibles for certain purposes)—they are greater robbers of the miner, from their roughness, than ever the furnace is to the smelter. The former loses all that is absorbed—the latter gets it when the furnace floor or hearth is broken up; and as to volatilisation, more is carried up the assay-office chimney (in proportion) than ever ascended through a furnace stack.

" I think I have shown that a perfect mode of assay can be effected, and let no one doubt of success—cleanliness and accuracy are required in b th plans—but, in the dry way, much labor (and hot work too), practice, and experience are necessary to know " fine copper;" but, by the process I advocate, the copper, by an unerring law, is made fine, and requires neither judgment or practice at all, and yet must be correct."

ADVANTAGE GAINED BY HEATING GAS BEFORE BURNING.

The efficacy of the patent lately taken out by Mr. Smith, of Leamington, for a hot gas burner, in which the gas is heated by the flame before it is consumed, was tested by Mr. J. T. Cooper, in a series of experiments, of which the following are the results as given by himself in a letter to Mr. Smith:—

" I find that when your patent form of apparatus is used with any argand burner, that the average increase of light from the consumption of the same quantity of gas, as ascertained by a great number of experiments, is in the ratio of 119 to 100, or an increase of nearly one-fifth; for with the gas which I employed, the consumption of 7½ feet per hour gave, when consumed by an argand burner of 16 holes, without your apparatus being attached, a light equal to 16¾ candles, and with the consumption of the same quantity, in the same time, and with the same burner, with your apparatus added, the light produced was equal to 20 candles.

" Although I felt in a great measure satisfied with the results I had obtained by this method of experimenting, yet I thought it desirable to vary the mode of operating, which I did in the following manner:—Having accurately adjusted two of Mr. Crosley's experimental meters, so that they registered precisely the same, I selected two similar Dixon's burners, and attached one of them to one of the meters with your patent apparatus added, and the other to the other meter without your patent apparatus, and regulated tho supply cock to each, so that they gave shadows of equal intensity. A considerable number of experiments were made in this way in order to obtain an average, the gas being supplied to both burners from a gas-holder constructed to give equal and uniform pressures; the results were that the hot gas burner consumed 5·3 feet per hour, while the burner arranged in the common way for an equal intensity of light was consuming 6 43 feet, which is in the ratio 100:121·3.

" In order to be certain that there was no difference to be attributed to any slight difference in the construction of the burners themselves, they were reversed, that is, the burner which had been used with the hot gas apparatus was applied to the ordinary mode of burning, and vice versa; the average results obtained were, the hot gas burner consumed 5·6 feet per hour, and the other 6:65 feet per hour, which is in the ratio of 100:119.

" Now in the first series of trials the ratios were as 100:121·3, and in the second as 100:119, the mean of which is, as 100:120, or an increase in illuminating intensity of 20 per cent.; which accords as near as can be expected with the first obtained results, and by methods so different, that I am induced to place the greatest reliance on their accuracy.

" The difference of increase in illuminating intensity by the use of the hot gas apparatus, is however more remarkable when the common bat-wing burner is employed; for I found that when two similar burners of this kind were substituted for the argands as in the former experiments, and being adjusted by their regulating cocks to produce equal intensities of light as determined by shadows, while that burner which was attached to the hot gas apparatus was consuming 4·36 feet per hour, the other which had not the advantage of the hot gas apparatus was burning 5·9 feet per hour; these as in the former cases being averages of a numb r of trials. The burners were then reversed as in the former experimei ts, and the results obtained were precisely the same; the ratios in these instances being as 100:135·3, or nearly 40 per cent."

EXPLOSION OF STEAM BOILERS ATTRIBUTED TO ELECTRICITY.

We mentioned in a preceding number, in connection with the discovery of the development of electricity from effluent steam, that M. Tassin, an engineer in Belgium, had many years ago conceived the notion that electricity is the cause of the explosion of steam-boilers. We find, in a late number of the *Fanal*, a more full account of the explosion of the steam boiler which M. Tassin adduces as confirming his opinion. We translate the account as an instance of the extraordinary effects produced by the expansive power of steam; and as an instance also of ingenious, though, in our opinion, fallacious modes of accounting for these effects, by the assumed operation of other causes. Now that the discovery of the development of electricity by the escape of high-pressure steam is exciting much attention, the cause assigned by the ingenious writer in the *Fanal* may appear to be more feasible than it would otherwise have been considered. For our own part, we attach no weight to it whatever, beyond that of a curious speculation.

The notion entertained by M. Tassin, that gradual pressure cannot burst an iron vessel, will not be borne out by other experiments. It is very probable, that a boiler may be so put together, that the rivets and joints may be the weakest parts, but it is also possible for it to be so constructed that the iron will rend before the rivets give way. We have ourselves seen a vessel rend asunder by the gradual pressure of a force pump.

" M. de Marotte possesses a large distillery at Vieux Waleffe, which is worked by a small steam-engine of eight horse power, and consequently has a boiler in proportion. The boiler is a cylinder, four feet in diameter and eighteen feet in length,

with a flat bottom, and through the middle of it there is a large fire flue. This form of boiler is much used in Belgium, and which gives general satisfaction.

"Some minutes before the explosion, the proprietor, examining the manometer, which indicated two atmospheres and a half, desired the stoker to raise the pressure of the steam. He, however, replied that it was sufficient for the work that was required at the time. Everything in other respects was acting as usual, and there was abundance of water in the boiler.

"Scarcely had M. de Marotte reached his house before the whole distillery was destroyed by a tremendous explosion. The boiler was separated in two, on one side the internal flue, about fifteen inches in diameter; on the other side, the main part of the boiler to which the other half of the bottom was attached. The flue, and the half bottom of the boiler attached to it, threw down the base of a chimney 9 feet thick, and the walls of four other different buildings that were in its course.

"The main part of the boiler flew off in an opposite direction, passing, in the first place, through the wall of the engine-house, 23 centimetres thick —broke the iron beam of the engine as a cannon ball would have done—broke all the machinery that intercepted its progress—overturned the other supporting wall of 23 centimetres of bricks,—and also the wall of a barn built of bricks, a metre in thickness. But what is still more extraordinary is that this barn, of the dimensions of 10 metres, and heaped up with sheaves of corn to the very roof, was also passed through by the main part of the boiler, which pierced the wall opposite, of equal thickness to the preceding one, but in which, however, it stuck. But this is not all. The bottom of the boiler, to which was attached a small portion of the flue,was blown from the body of the boiler, and killed three oxen in a stable which intercepted its progress; even this was not enough to stop the course of the fragment, which shattered two strong wooden posts 23 centimetres thick. The external wall of the stable did not arrest the progress of this part of the boiler, which dashed into the middle of the neighboring pond.

"All this was the result of electricity. With respect to the effect produced merely by the explosion of steam, a workman who was in a room immediately above the boiler was hurled through the roof to a very great height, and falling in the yard on a heap of sand, was killed on the spot.

"Another workman in the interior of the brewery, which was at a considerable distance from the boiler, and who was looking towards it, was thrown to a distance of fifteen feet against an open door by which he supported himself. This man declares that the boiler appeared surrounded by vivid lightning.

"It is the province of natural philosophers to explain this phenomenon, which renders all the methods of security hitherto invented to prevent explosions unavailing, and particularly the one which has been adopted in Belgium, for the security of our neighbors, which consists in building a party wall two metres thick. We will hazard the following explanation:—Every decomposition or change of condition in a body evolving electricity, the evaporation of water must also produce it; but as steam-boilers are never entirely insulated, the electricity returns to the general reservoir, as soon as it is formed. But is it not possible that the great number of copper pipes in connection with the boiler in this distillery, may have served as reservoirs of electricity that was accumulated within them? Is it not likewise possible, that a workshop, paved with asphaltum, might have the effect of insulating all the tubes, boilers, stills, &c. which are used in a distillery, and that hence all these apparatus charged with electric fluid at the highest tension may have caused the terrible explosion, the consequences of which we have just related?

"It must be observed, that as the discharge took place from the interior of the boiler, it was not the lightning alone that produced the effect, but the lightning armed, as it were, with the two portions of the boiler. The lightning alone certainly could not produce such effects.

"If this hypothesis be sound, we must correct all our notions, and all the methods at present adopted for obtaining security against the explosion of boilers; for according to what follows, it would appear that all such explosions are the effects of electricity, and are never occasioned by a *progressive pressure*, to guard against the effects of which such great and useless precaution is taken. Some experiments, made by M. Tassin, tend to prove this assertion. That engineer is now persuaded that it is impossible to burst a boiler by progressive pressure.

"Having filled a globular boiler of sheet iron, a quarter of an English inch thick, with water, he proved it with a force pump to thirty-six atmospheres of pressure. Having arrived at that point, the manometer began to fall, notwithstanding the pump was kept at work. He observed that a fine vapour exuded from every part of the boiler, and fell down like a mist. This effect is explained by the extension and opening of the different layers of iron, and the stretching of the holes of the rivets, which become oval during the expansion of the iron plates, and allow more water to escape than is forced in by the pump. M. Tassin perceiving that he could not burst his boiler made with thick iron plate, fixed over the man-hole of another boiler, by a number of screws, a plate of iron, only a line in thickness. When it was subjected to an enormous pressure, the iron plate became convex, the holes of the screws were enlarged, as in the preceding experiments, and the water escaped faster than it could be pumped in. He substituted a thin sheet of tinned iron, with the same result; so that this engineer is now convinced, that owing to the tenacity of iron, it is impossible for an explosion ever to take place from a gradual increase of pressure in a boiler. He is likewise of opinion, that no explosion can result from the gradual introduction of water into an empty and red-hot boiler, because he has many times repeated that dangerous experiment, the effect of which has been only to produce a contraction of the surface when cooled. He, therefore, refers all explosions of steam-boilers,with very few exceptions, to electrical discharges."

These experiments are said to have been made by M. Tassin ten years ago.

AVERY'S ROTARY STEAM ENGINE.

The following description of this engine is given by a correspondent of the *Mechanics' Magazine*, who inspected it in operation at the new iron works at Dunstan, near Newcastle:—

"The first sight of the casing is very splendid: the circular portion, enclosing the arms, radiates very beautifully from the centre, and the pedestal on which it stands is a very elaborate casting, something like the base of some of the French china clocks. The whole of the outward part of the machine is got up in a very superior style, which a brass plate on one side announces by 'S. Tate, Rotherham.'

"I was anxious to learn from Mr. Norval, the manager, the power of the engine, and the quantity of coal consumed. To these inquiries I could get no authentic answers, as the machine has only been about two months in operation, and an opportunity has not occurred of testing these particulars. In the short time I had to devote to the inspection, I ascertained the length of the arms from nipple to nipple to be 5 ft. 6 in.; diameter of holes of ditto, 5-16th of an inch; the steam pipe about 7-8ths ditto, inside, and capable of being regulated in its supply of steam to the engine. The speed varies from 1,500 to 2,000, and the engine is even capable of making 3,000 revolutions per minute. On the axle of the engine is a driving sheave 5 inches diameter, and 15 inches long, upon which a belt of that breadth runs.

"The boiler is 15 feet long and 2 feet in diameter, and pressed to 80 lbs. on the square inch. In it is 14 inches of water, which water is supplied from two circular heating cisterns, 15 feet long and 10 inches diameter. The cold water from the force pump is forced into the end of one, through which it circulates, and by a malleable iron pipe passes into the end of the next, through which it also passes, and from thence, by another pipe, flows into the boiler. These heaters are always *full* of water.

"In the absence of positive information, I collected what I could as regarded the consumption of fuel, and from what I saw and heard, I think it is about 10 cwt. per day of 10 hours.

"The boiler is set with the common flask flue. After the flame has left the boiler, it surrounds the heaters, and thence passes into the chimney.

"The guaranteed power of this engine is said to be 10 horses, but the present work is merely the driving a fan blast 4 feet diameter, and 20 inches wide, making 900 revolutions per minute."

PROPOSED MANUFACTURE OF IRON HOUSES.

The following article, translated from the *Fanal*, presents in most glowing colors the advantages to be derived from the construction of houses built of iron instead of bricks. Houses of this kind, but not combining all the paradisaical comforts of those now proposed, have been already made:—

"Railroads have given employment to and supported our iron works for five years; but the time is now approaching when this means of employment is drawing to a close, as our railway lines are nearly completed. It is necessary therefore to find a new source of application for the immense quantity of cast-iron that our blast furnaces produce.

"It must be used for building houses, bridges, and ships. In England and America iron has already been applied to those purposes; let us not remain behind, for we have not the excuse of the greater expense of the metal, since the price, whilo it is become higher in England, is reduced in Belgium, which gives us now the power of entering into competition with the largest producers.

"In fact our cast-iron is now at the price we expected it, to enable us to render houses more commodious and strong, warmer in winter, and cooler in summer than houses can be that are built of bricks. But iron houses possess still greater advantage. Secure from fire, they save the expense of insurance; secure from lightening, earthquakes, and inundations, they spare the lifes and properties of the occupiers. Being built with great rapidity there is no delay occasioned by waiting till the materials are dry. The pieces of iron fixed on solid bases one upon another, save the expense of foundations. As they may be very easily removed from one place to another, they afford the means of removal, should the occupier chance to be situated between disagreeable neighbours. Even should he wish to leave his country, his habitation could easily be removed with him into another.

"Rust is no longer to be apprehended as an objection, as the invention of galvanic painting obviates all liability to it. Houses built of iron would thus last for ever, without sustaining any injury. Should the style of architecture no longer please, the materials can be re-cast, so that the newest fashion could be adopted. All the trouble of having stone-masons, plumbers, and brick-makers will be avoided; and smoky chimneys will no longer annoy.

"Should a house be wanted immediately, from eight days after the order has been given, it may be cast, and in eight days more put together and habitable. Are we not living in fairy land? With what ease could whole towns built of iron houses be transported to new colonies, as ballast in the holds of ships! What orders would Belgium receive from all parts of the world, as soon as the first house was raised! How, indeed, can it be supposed that our great manufacturers, doubly interested in their success, can hesitate a month, a day, an hour,

in commencing the work? The house which M. Rigaud has so admirably planned is three stories high, it contains from 16 to 17 pieces, and weighs 80,000 kilogrammes (about 170,000 lbs.)

"By means of a single train on the railroad, the house may be transported from Brussels to Liege, to Ghent, or to Antwerp, for the sum of from 5 to 600 francs, and at a much cheaper rate by water. It is thus that we shall see travellers leave the Thames for Naples, Vienna, or Constantinople, taking their houses along with them, as they now take their carriages.

"In order to give an idea of the warmth of these houses, and particularly of the great saving of expense that M. Rigaud has introduced, it will be enough for us to say that the walls are hollow, and that the air heated only by the kitchen fire, circulates through all the apertures of the walls, and passes from one apartment into another; and that by means of ventilators below, the draft can be increased or diminished; all the pieces may be heated or cooled either together or separately, without difficulty, without smoke, without dust, without taking up the time of servants in carrying coals or wood up the staircases, without the trouble of grates and fire-irons, attended also with a considerable saving of expense from the curtains, carpets, ceilings, and every article of furniture not being exposed to dust, and remaining in perfect order. If in addition to this convenience we suppose the house to be lighted by the lamp *Robert*, of which the reservoir of oil is in the cellar, a real paradise would be formed, uniting splendour and economy."

BRITISH PATENTS.

ENGLISH EXPIRED PATENT.

John Whiting, of Ipswich, architect, *improvements in window-sashes and frames*, Jan. 9.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLLMENT OFFICE.

(*Continued from page 405, Vol. III.*)

John Edward Carpenter, of Toft Monks, Norfolk, *improvements in the application of machinery for assisting vessels in performing certain evolutions upon the water, especially tacking, veering, propelling, steering, casting or winding, and backing astern*, Dec. 12. Claim first.—The application or adaptation of submarine propellers, as hereafter described, in whatever situation such propellers may be placed.

Claim second.—The peculiar form of the propellers, shown in the drawings annexed to this specification.

These improvements may be divided into three parts:—

First—The method in which the propelling apparatus is fixed, for propelling vessels at the greatest possible speed attainable, with reference to submarine rotary propellers on the quarter.

Secondly—The method of applying the same apparatus, so as to turn vessels about without the assistance of wind or rudder.

Thirdly—The method of applying the apparatus to vessels, with one propeller at the stern.

The blades and screws forming the quarter propeller may be constructed either of metal or wood, their strength and superficies depending on the size of the vessel which they will have to propel. Spindles are constructed, which consist of moveable axles protruding through the vessel at both quarters, near the line of floatation, below the load-water line and above the keel, between the midship section and the stern frame. These spindles are enclosed by metallic cylinders, or other proper packing, having a cup and socket valve and stuffing-box at one, or both, ends, and are firmly secured to the timbers of the vessel. That part of the spindle which is within the vessel is to be connected to a steam-engine, or other first mover, by any convenient mechanical contrivance. The outer part is connected to the propelling shaft. The regulator consists of a rod furnished with a rack and pinion, with a pendant bearing attached to the propelling shaft at the bottom of the rod. Through this bearing the propeller shaft passes, by which means the propeller can be raised or lowered, as circumstances may require. The end or stern bearing is constructed of metal and bolted firmly into the transom of the vessel, so as to be capable of resisting the force of heavy seas against the propeller, and also of being easily detached. With reference to the second part of these improvements, a bevelled wheel is fitted upon the capstan, and this communicates the motive power to the propellers; there are two pinions which gear with the bevelled wheel. The axle of the pinions are connected with the spindles as above described. The propeller is confined in its position by a stay and other parts of the apparatus. The shaft rotates in a bearing, and can be raised or lowered by means of a topping lift. After the apparatus has been connected with the capstan, it is only necessary to turn that by power, and the head of the vessel will move round. The third part of this invention consists in the manner in which the rudder is divided, so as to admit the shaft of a single propeller to pass through it, and also in the form of the blades to be applied to such shaft. The length of each blade is more than twice its radius, and two of these blades are placed angularly upon the shaft, which is supported by a hinged bearing at its extremity, a strong iron connecting piece joining the rudder at its upper and lower divisions.

William Southwood Stocker, of Birmingham, *certain improvements in machinery applicable to making nails, pins, and rivets*, Jan. 2. Claim first.—Mode of combining the forging tools in a moveable frame, and causing such tools to approach each other and forge a bar of iron that is properly held by a machine, either in making the stems of nails or bolts, or in pointing their ends.

Claim second.—Mode of constructing the heading and cutting machine.

Claim third.—Mode of applying moveable dies to the machine, for heading pins and rivets.

Claim fourth.—The turning over by machinery and cutting a series of plates or strips of metal in making cut nails.

A crank axle is mounted in a strong frame communicating by means of pulleys to the engine. Four iron bars are caused to slide backwards and forwards in a frame by a rod from the crank axle. Other sliding bars are placed so as to move in a position at right angles to these. Their ends are supplied with anti-friction rollers, that work against an inclined plane. By these bars the forging tools are moved to their proper places. A tube extends along the machine, one end of which very nearly approaches the forging tools. A red hot bar of iron is passed through the tube: motion is given to the axle, which, through the connecting rod, gives motion to the sliding bars and rollers, causing the forging tools to close together, and their action on the heated bar produces the shanks of bolts, nails, or rivets, of any shape or size. The heading machines are constructed by a cranked axle, working the heading die, which strikes the bolt as it lies in a proper cavity, and forms the head of the nail or rivet. Another machine is shown in which the working parts are the same, only instead of a fixed cavity for holding the shanks previous to the heading, dies are used, one of which is moveable and the other fixed, and are held together by a spring catch and lever. With reference to the last part of these improvements: A pair of shears are worked by the revolution of a crank axle. At the face of these shears a series of cylinders are placed angularly. Through the end of each a strip of metal of the required width passes. The whole of the cylinders are connected by pinions and a rack, so that on the cranked axle being made to revolve, a nail is cut from each strip of metal by a descending cutter. A sliding motion is then given to the rack, which causes the cylinders and pieces of metal to move round sufficiently at every stroke of the cutter, to preserve the angular or taper form of the nails or brads.

Richard Freer Martin, of Derby, gentleman, *improvements in the manufacture of certain descriptions of cement*, Dec. 2.—Claim first.—The manufacture of cement from gypsum in its natural state, or from limestone or chalk, or from gypsum and lime with the addition of alkalies and acids in a solid state, without the addition of water in any stage of the operations, excepting such as may be contained in the substances; and whether the alkalies and acids are introduced separately, or in a compound state.

Claim second.—The manufacture of cement from gypsum and lime, with the addition of a third substance containing acid, or producing it on the combination; and without the addition of alkalies or substances containing the same; and, also, the manufacture of cement from gypsum and lime without the addition of alkalies and acids, excepting such as are contained therein.

Instead of adding the acids and alkalies in solution, as has hitherto been the practice, they are mixed in their solid state, either separate or together, and without using more water or liquid than is contained in the materials themselves. Pearl ash is dissolved in water, and a sufficient quantity of sulphuric acid added to render the mixture a neutral compound. The liquid part is then evaporated, which leaves the compound required in a dry or solid state. When it is necessary for the above to be added separately, the proportion should be such that they should neutralise each other; the proportions of which, with gypsum, limestone, &c., should be as follows: for every one part by weight of the alkalies, or combination, add one hundred and fifty parts of gypsum, or gypsum and lime in equal proportions; the whole after being reduced to powder is to be dried by being agitated in suitable revolving cylinders.

For manufacturing cement from gypsum and lime with the addition of acid, the following are the proportions:—two parts of gypsum to one part of lime, and to every one hundred parts of lime one part of sulphur, or other similar substance. For manufacturing cement from gypsum and lime alone, the materials should be in such proportions that the moisture given off by the process of calcining, should just be sufficient to slack the lime contained in the combination.

Chistopher Dain, of Edgbaston, Warwick, gentleman, *certain improvements in the construction of vessels for containing and supplying ink and other fluids*, Dec. 2.—Claim. The introduction of a valve or stop-cock between the reservoir, for the ink or other fluid, and the cistern containing the same, from which it is taken to be used, whatever may be the form of the valve or stop-cock so employed.

The reservoir for holding the ink is of glass and of a globular form. It has a long neck communicating with a cistern from which the ink is taken to be used. An opening is formed in the upper part of the neck, across which a saddle piece passes, and to which a short tube is attached. Through this tube a screw with a stopper at the end passes, for the purpose of closing the opening; a piece of metal also passes from the saddle piece to the top of the reservoir, where there is another opening, forming an air valve. The screw in the tube passes through a nut, also contained in the tube. This is turned by a proper key, and closing the aperture in the neck of the reservoir stops the flow of ink or fluid towards the cistern.

James Roberts, of Sheffield, merchant, *an improved mode of fastening certain kinds of horn and hoof handles to instruments requiring the same*, Dec. 3.—Claim. The fastening of softened horn or hoof handles, either solid or in scales, to knives and forks, by pressing such softened horn round projections, or into cavities formed for the purpose, on the part called the tang of the knives or forks.

The horn having been first softened is pressed into moulds so as to leave a cavity inside. The tang of the instrument is then inserted, having been previously notched, or had projections or studs formed thereon; it is then pressed together by a vice or screw, when the whole will be quite solid and never liable to become loosened. Solid handles

may be formed by being bored down while soft. The notched tang is then inserted, and the handle pressed together as in the first instance, when it will be firmly fixed.

GEORGE HENRY BURSILL, of River-lane, Islington, gentleman, *an improved method or methods of weighing, and certain improvements in weighing machines*, Nov. 28.—Claim first.—The employment of two indicator columns; one of mercury, the other of any fluid of less specific gravity, in conjunction with the following arrangements, or any of them.

Claim secoud.—The application of a column of mercury in connection with a piston or plunger, and guide rods.

Claim third.—The employment of tubes or vessels in the form of an arc of a circle, for the purpose of containing the mercury either when one or two indicator columns are used.

Claim fourth.—The employment of an ordinary scale beam, on the steelyard principle, either with one or two columns of mercury, and with or without the employment of the piston, or plunger, or the compensation apparatus.

Claim fifth.—The compensation apparatus, either as applied to these improved machines or to ordinary weighing machines.

A cylindrical vessel containing two tubes fits into a vertical socket. The tubes are of different sizes, and are joined together by a horizontal leg. Mercury is poured in until it rises to an equal height in both tubes. A piston or plunger rises and falls freely in the large tube, at the upper part of which there is a scale-pan attached. A small glass tube containing some liquid of a less specific gravity than mercury is fitted air-tight into the small tube. A graduated index plate is placed in contact with the glass tube, the zero point of the scale being brought to the exact level with the top of the colored fluid. If a weight be placed in the scale-pan the piston will be pressed downwards; this will displace a portion of the mercury in the large column, and thereby cause the lighter fluid to rise in the glass tube. The parallel motion of the piston is preserved by means of guides working on separate centres. Another apparatus is described, intended for heavy as well as light weights. The mercurial holder is in the form of a curved tube; this communicates with a vertical glass tube containing a light fluid; a steelyard beam rests on knife edges. Near one extremity at the other end a scale-pan is suspended, and at the same distance within the fulcrum a second pan is suspended; between the glass tube and the end scale-pan a curved piston is fixed. The scale-pan near the end is for light weights, the other for heavy weights. The next apparatus is upon the same principle, but has two index plates; by which arrangement the amount of weight may be seen by the buyer and seller at the same time. There are two simple forms of apparatus described for compensating for the changes of the temperature, which may be applied to either of the above machines or to barometers.

JOHN DAVID POOLE, of Holborn, practical chemist, *improvements in evaporating water and other fluids*, (being a communication), Jan. 2.—Claim. The construction and application of an apparatus, by which no fluid but that intended to be evaporated, is used.

A cylindrical boiler is built over a furnace in the ordinary manner, by the side of which is arranged a series of other boilers, each containing a worm; underneath each boiler is a box, and under each box a cistern; the cylindrical boiler is supplied with liquid, and the steam it generates is conveyed by connecting pipes from one worm to another, whilst any heat remains, and being condensed fully through the boxes into the cisterns below: by this arrangement a great saving in fuel is effected, as not any of the heat from the steam is lost.

JOHN WILLIAM NYREN, of Bromley, manufacturing chemist, *improvements in the manufacture of oxalic acid*, Dec. 26. Claim first.—The mode of manufacturing oxalic acid from a product obtained from the farina of potatoes and sulphuric acid.

Claim second—The mode of manufacturing oxalic acid from a product obtained from horse chestnuts and sulphuric acid.

Claim third.—Mode of manufacturing oxalic acid by converting suitable liquids in leaden vessels into oxalic acid.

A quantity of potatoes are first washed, and then rasped, ground, or smashed into a pulp; this pulp is washed with water, and then allowed to settle; when the water is drawn off, and a fresh quantity of water added, with sulphuric acid or oil of vitriol of commerce, in proportion of 2 per cent. in weight to the potatoes used; the whole is then boiled for some hours, until all the farina contained in the potatoes has arrived at a desired state, which may be proved by a drop of iodine being dropped into a small quantity of the boiling liquid on glass, when, if the glass remains colorless, the process is complete. For obtaining oxalic acid from chestnuts, the same process is observed, only the chestnuts are not washed. When the proper liquid is obtained, it is placed in leaden vessels, or wooden vessels lined with lead, about eight feet square and three feet deep; the liquid is placed therein and heated by a coil of lead pipe, 48 feet long. and 1 inch diameter, which will be found to keep the contents of the vessel at a proper temperature.

THOMAS DELARUE, of Bunhill-row, manufacturer, *improvements in printing calicoes and other surfaces*, Dec. 20. Claim first.—The employment of a wire fabric as a printing surface.

Claim second.—The application of electro-type plates, obtained from wire tissues or fabrics.

Claim third.—The mode of printing in several colors, in order to produce rainbowing.

The inventor, after describing the different methods of carrying out his claims, observes, that he does not confine himself thereto, or to any form or modification of the same. We will, therefore, simply say, that the wire cloth is passed between two smooth rollers, when it offers a fair printing surface. The electro-type plates are formed by embedding the wire fabric in a sheet of lead, about the thirty-second part of an inch thick, which is done by passing the two between a pair of smooth rollers. The rainbowing, for straight lines, is performed by an ordinary doctor roller, which has grooves turned in it one-sixteenth of an inch wide, and one-eighth of an inch deep, into which plates are inserted, which keep the colors separate. For printing in curved lines, a conical roller instead of a parallel one is employed.

WILLIAM M'MURRAY, of Kenteith-mill, Edinburgh, for *certain improvements in the manufacture of paper*, Jan. 1. Claim.—The mode of withdrawing water from the rotary strainer of a paper-engine by means of syphous.

A tube is fixed horizontally on bearings, one on the mid-feather, the other on the side of the engine. This tube has a long leg which forms the syphon, and two shorter ones standing down at right angles; these ends are open at the bottom. The lower end of the long leg is furnished with a stop-cock, and at the upper part an air valve. There is also an opening in the side of the long leg, below the line of the horizontal tube, which leads through a pipe to a funnel, just under which there is a stop-cock. The short arms remain within the revolving strainer, and are as long as possible without interfering with the revolution of the strainer. When the engine is to be worked, the stop-cock at the lower end of the long arm is closed, the air valve and the cock below the funnel is opened, through which opening water is poured until the short arms are filled; the cocks are then reversed, and a continual tail stream will flow from the strainer through the lower end of the long arm.

THOMAS SPENCER, of Manchester, machine-maker, *an improvement in twisting machinery used in roving, spinning, and doubling cotton, wool, silk, flax, and other fibrous materials*, Dec. 26. Claim.—The construction and application of the cylindric apparatus as described.

A cylinder of tin, brass, or other metal, is formed open at the lower end and closed at the top, where it is fastened to the spindle and partakes of its rotation. The object being to run with increased speed without increasing the vibration of the spindles.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page 405, vol. III.*)

JOSEPH LEESE, jun., of Manchester, calico printer, *certain improvements in the art of printing calicoes and other surfaces*, Dec. 24. The principal part of these improvements consists in substituting a novel fabric for the blanket usually employed in calico printing; which fabric shall be perfectly elastic in its thickness, and non-elastic both in its length and width. It is composed of several layers of calico or other fabrics; between each of which a coat of india rubber is put on in solution. The ends are then fastened together, and the improved endless fabric is complete.

Another part of these improvements relates to what is technically termed "rainbowing;" the apparatus for which is as follows:—Several series of sieves containing colors of different shades are placed nearly under each other. Over each sieve there is a revolving disc, having projecting arms, of copper wire or other suitable material, which dip into the colors. The axes of these discs are supported by adjustable pedestals; and as the discs revolve, the copper arms give color to the cylinder in successively lighter shades, which is then imparted to the fabric under operation.

A third part of these improvements relates to the covering printing blocks with a surface of india rubber, through which the pattern is afterwards cut, the sides being supported by a suitable metal edging; by which arrangement the block will be much more durable, and the pattern be better and more clearly printed.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 13th of March.

William Daubney Holmes, of Cannon-row, Westminster, due March 3.

Thomas Horn, of Birmingham, due March 3.

James Bingham, of Sheffield, due March 3.

To the Editor of the "Inventors' Advocate."

SIR,—As the agent to Capt. Handcock, of Birmingham, allow me to correct an error in your list of new patents, contained in last week's "Advocate."

In that granted to Elias Robison Hancock, (that should be *Handcock*), you describe it as being for "certain improvements in mechanism applicable to turn-tables, for changing the position of carriages upon railroads, for furniture and other purposes." This would make it appear as applicable to *changing the position of furniture*, instead of which the title of the patent was thus, "certain improvements in mechanism applicable to turn-tables, for changing the position of carriages upon railroads, which improvements are all applicable to castors for furniture and other purposes."

As a constant reader of your valuable paper, I am fully sensible of its general correctness, and am quite sure that the above only needs pointing out to ensure its being properly quoted.

I am, sir, yours very respectfully,

JOHN GEORGE HUGHES.

RECENT AMERICAN PATENTS.

[Selections from Dr. Joues's List in the Journal of the Franklin Institute, for Aug. and Sep., 1840.]

An Improved Method of Manufacturing Sulphuric Acid; *J. Hargreaves, August* 24, 1839. —"I cause," says the patentee, "the sulphur to be burnt in a pan, in a close furnace, by fire below the same; and the vapour arising from the combustion of the sulphur is forced and driven, by a blast of atmospheric air from the furnace, through a tube leading therefrom to a close receiver filled nearly full of water, and discharged near the bottom of the receiver, in such manner that the vapour ascends through the water to its surface, and by combining with the water forms sulphuric acid. I also cause the vapour to be met by a blast of steam and atmospheric air while yet in the furnace, and before passing into the receiver, to cause the vapour of the sulphur, or sulphurous acid, to combine with one more equivalent of oxygen, a dry atmosphere being unfavorable to the combination; and the vapour, after passing through the water in the first receiver, rises through another tube fixed in the top of that receiver, and passes through another receiver in the same manner, and so through a third, or more, as may be found expedient; and as the acid, in a concentrated state, is drawn from the first receiver by a cock at the bottom, the weaker acid from the second receiver is drawn into the first, and that of the third into the second, and thus the water being placed in the last receiver passes through the several receivers, becoming more and more concentrated, until it is drawn from the first receiver in the form of sulphuric acid.

"In order to render the process more effectual, I insert in the receivers horizontal shelves, to cause the vapour to pass a greater distance through the water, and these shelves, as well as the receivers, should be covered with lead. The blast of atmospheric air may be made with a cylinder with double blast, or in any other manner to make a steady and uniform blast, and the blast of steam may be made by a boiler over the sulphur furnace.

"What I claim as my invention is, the manufacturing sulphuric acid in the manner herein set forth —viz., by introducing a blast of air to force the vapour of the burning sulphur through the water in the receivers, and by introducing a jet of steam with atmospheric air into the furnace, to meet the vapour of burning sulphur, as herein described."

For Supplying Ink to the Pens of Ruling Machines; *Lewis Edwards, August* 31, 1840.— The ink is to be contained in a trough extending along at the heads of the pens, and into this trough one edge of a piece of cloth is to dip, whilst the other portion of the cloth lies upon the pens, and supplies them with ink, by capillary attraction. Lines may be ruled with differently colored inks at the same time with the ordinary lines, by means of small cups of colored ink placed within the troughs, and having a strip of cloth leading from it to the pen, or pens, to be supplied. The claims are to this particular mode of giving the supply.

Ever-pointed Pencil Case; *John Hague, August* 16, 1840.—In this pencil case the pencil is to be protruded by the sliding of an outside tube, which covers the slot on the tube within it, and the claim is to "the mode of protruding the point by a middle outside tube, the whole constructed and operating as set forth."

Dovetailing Machine; *Ari Davis Boston, August* 21, 1839.—This is an ingeniously contrived and a well-operating machine for making dovetailed tongues and grooves on the ends of boards, for forming boxes, and other articles requiring to be similarly jointed together. The joints are to be mitre joints, and upon one of the boards the mitre is formed with a dovetail groove along it, and upon its corresponding piece, a dovetail tongue. These mitres, tongues, and grooves, are cut by circular saws fixed upon moveable standards, in such a way as to be capable of exact adjustment. The claim is to the described manner of constructing this apparatus so as to cut the mitre and the tongue, or the groove, at the same time.

Machine for Punching Metals; *Samuel H. Brown, August* 14, 1839.—In this machine, the punch is to be forced down by the raising of one end of the lever, on which it is fixed, by the action of a cam; this cam is made to operate upon a system of friction rollers, to lessen the friction, and the claim made is to "the arrangement of the rollers, in combination with the cam lever; that is to say, placing the two rollers on which the cam acts, in a box or carriage, which travels on another set of rollers, in the manner described."

FOREIGN INTELLIGENCE.

BELGIUM.

EXHIBITION OF MANUFACTURES.

The Chamber of Representatives have exhibited a narrow-minded and ill-judged economy in their refusal to vote the sum of money proposed by the Minister of the Interior, for the exhibition of the usual manufactured articles of Belgium, and for the Museum of Arts and Manufactures. The proposition made to them was to vote 100,000 for the exhibition of 1841. Three sections of the Chamber adopted it without discussion. Of the three other sections, one was not convinced of the propriety of an exhibition in 1841; the second denied the necessity of an expense to that amount for such an object; and the third refused the vote, on the ground that an exhibition every ten years was sufficient: the central section concurred in the latter opinion, and by this means the vote was rejected.

In referring to that part of the budget connected with the Museum of Arts and National Industry, the Minister of the Interior, in making the proposition, remarked,—"The Government, desiring to organize this establishment, and to impart to it a development, and a direction better adapted to the wants and progress of industry, is under the necessity of requiring an increase of 25,000 frs. in addition to the 25,000 frs. previously granted, for the purpose of furnishing the Museum with objects which it is essential that it should possess."

The following is the reply of the central section: "This item contains an increase of 25,000 frs., which is not approved by any of the sections. It is also rejected by the central section; the situation of our finances not permitting expenses that are not absolutely necessary: consequently, the amount voted for 1840 is restored."

The *Commerce d'Anvers* remarks on these decisions:—"These recent developments of the spirit that animates the Chamber have a very serious character, because they indicate the existence of a systematic opposition to every thing which tends to give a greater and more complete satisfaction to the real wants of the country. The central section is of opinion that a decennial exhibition of the products of industry is sufficient; and, as regards the Museum, it refuses the required increase, because the situation of the finances does not admit of expenses *which are not necessary*.

"To these decisions, which originate, even on the most favorable hypothesis, from a niggardly spirit of economy, the true economists would reply, that when interests so essential to Belgium as commerce and manufactures are concerned, there is nothing more ruinous than a parsimony that would check the improvements which they require; and that expenses which may be the means of introducing such improvements are, above all others, expenses of necessity. All the questions raised in the Chamber, since the opening of the session, have exhibited a great want of enlarged, profound, and just views, which, comprising all the bearings of things, do not, when looking to the future, hesitate at slight sacrifices which are required at the present. These last refusals of the central section have too important a signification, and the interests of trade are too intimately connected with those of manufactures, not to deserve the serious consideration of the country."

FELTED CLOTHS.

The manufacture of these newly-invented cloths is exciting great interest in Belgium. A patent of importation for the space of five years has been granted by the Belgian government to the Phœnix Society at Ghent, for a complete set of machines for manufacturing cloths, carpets, &c., by means of felting, together with the improvements that have been made in it till the present time. The Phœnix Society are bound, by the conditions of the patent, to deliver the machines to the manufacturers of the country at the following maximum prices:—

	frs.
The carding machine	3,570
The felting machine	3.570
The planking machine	9,945

Should the English manufacturers reduce the price of the manufacture, the society engages to furnish machines at the same price. The society engages to give the manufacturers of the country for whom the machines are made, all the directions necessary to bring them into operation, without infringing on the right of the patentee. They, moreover, engage to submit all the machines to a series of experiments, or trials, previously announced, and in presence of the manufacturers of the country, who may demand to be present, in such a manner that they may be enabled thoroughly to appreciate the value and results of this new machine. These experiments are to be carefully made by the society in the course of four months, commencing from the date of the patent. They are to give notice in the public journals on what day these experiments will begin. The experiments are not to be continued longer than fifteen days, unless government should consider it necessary to prolong the time of trial. A month after these experiments, the manufactory of the Phœnix will furnish, if the order has been previously given, a carding, a felting, and a planking machine.

The Brussels papers state that on Monday morning a large and well-defined halo, with irideal colors, was seen from that city surrounding the sun, and at the extremities of its vertical and horizontal diameters, parhelia, or mock suns, were more or less distinctly marked. Through the zenith point of the vertical diameter another arc of a halo, with its convex side turned towards the sun, also appeared, and assumed a parabolic rather than a circular curve. This rare and highly interesting phenomenon lasted from nine in the morning till half-past twelve. The barometer, in the morning, had stood at 30 inches, and the thermometer 0.15 4-5ths above zero of Fahrenheit.

From the month of November, 1839, to the month of November, 1840, there have been printed in Belgium 320 different original works, in the following languages:—in French 218, in Flemish 92, in Latin 6, and in German 4. In 1839 the number was 300, of which there were in French 197, in Flemish 88, in Latin 4, in German 5, in English 5, and in Italian 1. The different subjects treated of in the works published in 1840 are the following: Belgian history 32; literature 63; biography 11; numismatics 4; grammar and lexicography 14; historical literature 1; public lectures 9; ascetics 9; medicine, surgery, and anatomy 15; strategy 3; bibliography 6; political writings 3; religious pamphlets 10; legislation and judicial sciences 10; statistics, political economy, treatises on the science of government 15; mathematical science 6; fine arts 4; heraldry 2; mineralogy 1; annuals and almanacs 17; periodical works 24; miscellaneous works 24.—Total 320.

A plan is in contemplation by which the Society of Sciences, Arts, and Literature, established at Mons, the commissioners of the Museum, and the commissioners of the Library, will form an association, the object of which will be to encourage the

study of the fine arts, as well as of literature and science. An annual programme will be published, containing artistical and literary subjects to be treated of, and scientific questions to be solved. These associations will be composed of an indefinite number of members. Any one may be admitted who has received permission from the acting committee, to contribute annually at least 10 frs. to the funds of the society.

PRUSSIA.

SOCIETY FOR THE ENCOURAGEMEMT OF INDUSTRY.

The society founded at Berlin for the encouragement of national industry in Prussia continues its important labors. The efforts of this society, at the head of which is M. Beuth, have had a fortunate influence in the encouragement of different branches of trade, in a country that does not possess much agricultural wealth, but whose manufactures have since the peace rapidly increased.

The society had proposed a prize of a gold medal and a sum of 1,600 francs for improvements in the manufacture of printed calicoes, by the use of engraved printing rollers. This prize was obtained by M. Kœnig, whose prints appeared to give satisfaction.

A gold medal was awarded to M. Pictte, of Dillingen, for his treatise on the manufacture of paper from straw.

Among the prizes proposed we shall select the most important.

A gold medal and 4,000 francs for a process to remove the disagreeable taste and smell from beet-root syrup.

A medal of the same kind, and 3,500 francs, for a composition of factitious stone, to imitate the stones used for building.

A gold medal and 2,500 francs for the preparation of a vat of indigo, in a cold state, for dyeing calicoes blue.

A gold medal and 2,000 francs for the preparation of a water cement with indigenous substances.

A gold medal and 3,500 francs for experiments calculated to determine the force of traction on paved and other roads.

A medal of gold and 2,000 francs for filling steam-boilers regularly without the use of a pump.

The papers of the Berlin society, published in periodical numbers, are embellished with a great number of wood-cuts, carefully executed by an English artist. Those which appeared in 1839, among other interesting documents, many of which are extracted from foreign collections, contain:—

A paper on the manufacture of micrometer screws, by M. Baumann.

A paper on the cultivation of beet-root in Prussia.

On the manufacture of cast steel, by M. Krupp, with the result of the experiments to which it has been submitted.

A paper on the manufacture of Damascus blades.

A description of a machine intended to cut the teeth of cog wheels, executed in the workshops of M. Hoffman.

Process of dyeing wool in clear blue tints, by means of prussiate of iron.

A paper on the discoloring properties of animal charcoal.

On the comparative qualities of English and German steel.

Experiments on making foot pavements with different compositions of bitumen.

Many French inventions have been lately successfully introduced in Prussia. Among others is the machine of M. Perrot, of Rouen, for printing calicoes in various colors.

RAILWAY INTELLIGENCE.

DOMESTIC AND FOREIGN.

The *Liverpool Courier* states, that since the fares were recently lowered on the Chester and Birkenhead Railway, the traffic on the line has increased nearly threefold.

PROPOSED EXPERIMENTS ON RAILWAYS.—The following suggestion, which is well worth the attention of Government, is made by a correspondent of the *Railway Times*, for the purpose of facilitating the making of experiments on railways, with a view to the improvement of the system:—"On lines in full operation there is very little opportunity of making experiments with perfect security, and in the presence of scientific men, who by such processes may judge of the value of the expedient proposed, and thus be led to suggest further improvements. The obvious plan would be to appropriate a sufficient length of rail in the neighbourhood of London, where experiments might be carried on by scientific men in the presence of the public. This would afford a theatre for the invention and display of every thing which may assist the progress of railway science. The several companies could not be expected to lay out money for such a purpose, which could only be effected by a grant from Parliament. If the Government should patronise the measure, it might be carried into execution either by attaching the requisite length of rail to some short line, the West London for example, or by fixing on some level spot of open ground, where no expense would be required but that of laying the rails, which might be done at a comparatively trifling expense. If the experiments should not be productive of good results, it would be easy to dismantle the works and sell the materials: but if the process should add to the safety, comfort, and convenience of the public, I am certain no member of either house would think the money ill laid out."

MANCHESTER AND LEEDS RAILWAY.—This line of railway was opened throughout (with the exception of the Summit Tunnel) on Thursday, the 31st ult. On perusing the report of the directors, dated 17th September, 1838, we find it stated that "during the present year the entire line may be expected to be in the course of execution, and it is hoped should nothing unforeseen occur will be opened to the public within the year 1840." Considering how difficult it is to state so long before-hand the probable period when works of even ordinary magnitude may be completed, this certainly affords an extraordinary instance of the liberal fulfilment of the expectations held out by directors to their proprietors. This appears the more remarkable when the gigantic character of the works in question is taken into account; the difficulties in which were pronounced by many to be insuperable. The repairs now going on at the tunnel, we understand, were quite "unforeseen," but even this circumstance will not delay the entire opening beyond a month from the present date.—*Leeds Mercury, Jan.* 2.

BIRMINGHAM AND GLOUCESTER RAILWAY.—Mr. C. Appleby, who complains that as director, proprietor, and traveller he has suffered many things by railways, writes to the *Times* from Gloucester, on the eve of Christmas-day, smarting under the inconvenience of being detained at an inn in that city intead of being with his family at Bristol, owing to the Birmingham and Gloucester railway not having adhered to their published engagements. The following is his complaint:—"My family resides at present at Clifton, near Bristol, and they would expect me this night (Christmas-eve) by engagement; and the time-table of the Birmingham and Gloucester railway company led me to conclude that I should accomplish this engagement, because they announce themselves to be in connection with the Derby and Birmingham trains, reaching Birmingham at 2 p.m., and conveying the passengers to Bristol, Bath, &c., by their train, leaving Birmingham about the same time. The Derby and Birmingham arrived at that hour, or just exceeding 2 h. 3 m. p.m. this day, at Birmingham; and I, with a military gentleman, lost not a moment of time in reaching the Gloucester station, when we were informed that the train for that place had started three minutes previously. I exhibited to the managers one of their own bills, to prove that they were compelled to forward us *instanter*, inasmuch as they announce to the public that they convey passengers from the Derby and Birmingham at 2 p.m., without delay; and I illustrated their liability by the example of the Derby and Birmingham company, who had been obliged, about 10 days previously, to forward five special trains in less than half an hour under similar circumstances. The highest authority present, a Quaker, was summoned to reply to our request for being forwarded by a special train, when he characteristically evaded our application by declaring that he had no authority to order a special train under any circumstances. He admitted, however, somewhat unwittingly, in answer to our remonstrance upon the disregard that was thus shown to their promises to the public, that they had, perhaps, been guilty of 'oversight in their arrangements,' and I have now to prove whether I am to be the sport of their confessed mismanagement."

ATTEMPT TO OBSTRUCT A RAILWAY TRAIN.—On Tuesday week five laborers on the Midland Counties Railway were charged before the magistrate at Leicester with having on the 24th Dec., attempted to obstruct a train upon the railway. About half-past nine o'clock on the evening these men went in a body to the Wigston station, and in a threatening manner called upon the keeper of the station to stop the train then expected from Rugby to Leicester. They said they wanted to go to Leicester, and would insist upon the train being stopped to take them up. As the keeper was resolute in his refusal, the party threatened that they would tear up the gate, and by flinging it on the rail overturn the train. This threat, however, was not carried into execution, owing to the decision and firmness of the keeper, who, partly by force and partly by entreaty, persuaded them to desist. Finding that their object here was defeated, the party walked towards Leicester. There was some extenuation of this outrage offered by the defendants. They stated that they were rather "fresh." This was not considered an aggravation, as it might have been. They had also the benefit of a character for sobriety and steadiness. They were all fined sums varying from £5 to 15s.

CHARGE OF OBSTRUCTING RAILWAY SERVANTS.—Three young men of respectable appearance were charged at the Mansion House, on Wednesday, with having obstructed the men employed on Blackwall Railway, in the discharge of their duty. It appeared that the three defendants arrived at the Minories from Blackwall on Christmas eve, and as one of them had dropped his glove, he and his companions refused to leave the station till they had seen the guard. They were told to "move on," when they became very violent; and it required ten men to force them away to clear the place for the next train. They were taken to the police station-house. They were all intoxicated. The defendants complained greatly of the insolence of the company's servants, and that they had refused to send a messenger to their families to acquaint them where they were. They were fined 20s. and 10s.

EFFECTS OF THE BIRMINGHAM AND GLOUCESTER RAILWAY.—The effects of the opening throughout are now beginning to be felt. The traffic return for the week ending December 25th was £1,000 7s. 11d., being the largest sum received in one week since the opening.—*Cheltenham Paper.*

PROPERTY EMBARKED IN RAILWAYS.—A list of railways now completed and progressing, has been compiled in order to prove the value of this description of property, which, in a national point of view, is highly important, for in the construction of these valuable works, though involving so very extensive a capital, be it remembered, that every shilling has been expended in our own country—first, in the payment of land to the land-owners; secondly, in the wages for the production of coal and iron in the manufactory of the materials; and lastly, in the wages to the workmen in every department in the execution of these gigantic undertakings, which are both useful and ornamental, and prove the great master-mind of science. The energy and exertion

required in the prosecution of these works, justly entitle the directors and proprietors to the best thanks of the public. Of the railways now in the course of full work, some idea may be formed of the immense revenue that will be established when the whole of the undertakings come into active operation; but, it must also be observed, that the various lines, when completed, will greatly benefit those of which the last year's gross receipts are now given:—Liverpool and Manchester, £255,979. 9s. 9d.; Grand Junction, £435,684. 6s. 6d.; London and Birmingham, £752,592. 10s. 2d.; London and South Western, £227,208. 2s. 5d.; Great Western, £240,084.6s.7d.; Midland Counties, £53,247. 2s. 1d.; Birmingham and Derby, £48,913. 14s. 9d. Of this sum, £1,006,854. is divided amongst the proprietors; but where does the remainder go to? it is expended on the works, and in wages to the labourer; equally beneficial to all. This newly-created property, in a very great measure, arises from the overflow of wealth, and in every point in which it can by possibility be considered, must afford to the reflecting mind, satisfaction, in the increasing prosperity of this our native land.—*Statistics of Railways, drawn up by Mr. Dawson, a Stockbroker of Liverpool.*

Railway Communication with Scotland.—The *Railway Times* of Saturday contains a copy of the third report of Lieutenant Colonel Sir Frederick Smith and Professor Barlow, the commissioners appointed, pursuant to a vote of the House of Commons, to examine and report upon the competing lines of railway to Scotland. From this report it appears that the preference of the commissioners has been given to a line called the "Grayrig line," running from Lancaster to Carlisle *viâ* Kendal. It is a combination of two different lines, prepared by Mr. Larmer and Mr. Bentley. The route north of Carlisle has not yet been decided, but Sir F. Smith is now engaged in the matter.

Opening of the Great North of England Railway for the Conveyance of Coals, &c.—Monday, which was long looked for, was ushered in with severe snow storms, which continued throughout the day; notwithstanding, immense numbers of people congregated together at an early hour in the morning at the station-house, the coal depots, and at different places adjoining to the railway, especially at the Castle-hill, the Zetland-bridge on the Richmond-road, and the grand stand on the race-ground, in order to witness the arrival and passing of the engines and trains of coal wagons. About half-past ten in the morning the first two engines passed by the station-house without stopping, drawing 102 wagons of coals on their route for York; in about twenty minutes after two more engines arrived, drawing 99 wagons laden with coals, which stopped a short time to take in water, and then proceeded to the southward; the next two engines which arrived, drawing about the same number of wagons, were accompanied by a band of music and numerous flags flying, which, after taking a supply of water, also proceeded to the south. Fresh trains continued to arrive until about half-past three in the afternoon; the last four trains were for the depots at Thirsk and Northallerton. Trains of wagons will continue to arrive at the different depots on the line of the said railway on Tuesday and Wednesday, so as to fill up each depot with various kinds of coal from the most celebrated mines in the county of Durham. On this day no misfortunes have happened on this part of the line of railway.—*Leeds* (Wednesday) *Journal.*

RAILWAY ACCIDENTS.

Fatal Accident on the Brighton Railway.—At Hayward's-heath, about 12 miles from Brighton, the railroad is carried, by means of a deep cutting, through a hill. This cutting is not yet completed; but in order to expedite the work, a temporary tunnel has been formed through the hill, the upper part being secured by means of props of timber, and rails have been laid on which a locomotive engine has for some time been working. On Friday afternoon, just as the engine was approaching this tunnel, or temporary "heading" as it is termed by the excavators, a portion of rock which had been loosened by the thaw fell on the rails, and before the engine-driver had time to stop the engine, it, with the tender, was thrown off the rails, and ran against one of the props of the heading, the consequence was a displacing of a portion of the horizontal planks at the top, and the fall of a mass of earth on the engines, by which the driver and stoker were killed. A number of workmen hastened to the spot, but the steam that was hissing with great force from the half-buried engine, rendered their efforts of no avail, and one of the party was suffocated before he could make his retreat. The works will not be retarded by this unfortunate accident, as the earth has already been cleared away, and the bodies of the sufferers removed to await the coroner's inquest. On Monday an inquest was held on the bodies. The occurrence seems to have originated in the chimney of an engine used in the construction of the works having caught in the heading, through not having been lowered in time. This was the fault of the men in charge of it—namely, two of the deceased. Verdict—"Accidental death," with a deodand of 1s. on the chimney of the engine.

Railroad Fire.—On Monday a luggage train on the Birmingham Railway was threatened with destruction, from the sparks of the engine-furnace falling upon the wagon next the tender, and consuming the valuable cabinet furniture with which it was laden. Fortunately it was separated before the flames extended throughout the line of the train.

Fatal Accident on the Southampton Railway.—On Wednesday evening an inquest was held at St. Thomas's Hospital on the body of John Thomas Crow, aged 21, whose death occurred on the Southampton railway at Waterend. The deceased was a stoker, and about a month since he accidentally fell from the tender, as he was removing a sack of coke. He fell down the embankment at Waterend, which is nearly fifty feet high, and in consequence of the fall, and the collision with the ground, when the engine was at full speed, he received the severe injury which caused his death. Verdict—"Accidental death."

FOREIGN RAILWAYS.

New Spanish Railroad.—It has been proposed to form a company, of Spanish capitalists only, for the establishment of a railroad between San Felipe de Xativa and Valencia, only ten leagues' distance (all level ground), for the speedy conveyance of passengers, as well as silk, rice, &c., to the shipping port.

Railroad from Antiquere to Seville.—A plan for a railroad between Antiquere and Seville has been submitted to the Government, by which passengers proceeding to Malaga will be spared the delay of crossing the Straits of Gibraltar.

Proposed Railway in Canada.—The inhabitants of the eastern townships of the Lower Province of Canada have urged upon the Governor-General the project of a new railroad to intersect the tract of country between the town of Sherbrooke and St. John's. The whole length of projected road, it is calculated, will not exceed 85 miles. Its route will start from Sherbrooke, and pass through the townships of Oxford, Ascot, Hetley, Bolton, Stukeley, Brome, and Shefford, a small portion of St. Hyacinthe, Monnai, and Renville, to St. John's, where the farmer of the townships may take his choice of the markets of Montreal, Quebec, and the United States—all of which are accessible either through the Champlain and St. Lawrence railroad, the Chambly Canal, or Lake Champlain. It is proposed to carry this project into effect in three ways, or by conjoining them:—first, as a government undertaking, to be managed by a board of trustees; the funds to be raised upon the credit of the province; the interest to be paid from the receipts of the railroad, or in case of a deficiency from that source, by the public revenues, as in the case of some works of Lower Canada, and numerous public works in Upper Canada. The second proposition is, that of a joint-stock company, with corporate privileges, like the Champlain and St. Lawrence, and other railroads. The third proposition is, that of a local undertaking, for which the funds are to be raised on the credit of Government, and the payment of the interest to be secured by local assessments upon the lands of residents and non-residents, something in the following manner:—The lots to be divided into three classes; the first class to include all lots lying within 10 miles of the railroad; the second class those lots lying between 10 and 20 miles; and the third class to include all lots between 20 and 30 miles of the railroad: the assessments to be graduated according to the distance which each class of lots may be situated from the railroad.

PREVENTION OF RAILWAY ACCIDENTS.

The railway companies in all parts of the kingdom are about to hold a general conference, at which delegates from each will attend, for the purpose of adopting measures that may afford the best security against accidents. The Liverpool and Manchester Railway Company, as the first established line of communication on which locomotive engines were successfully introduced, have taken the lead in this matter, by sending a circular, with a copy of the report of a sub-committee of their directors, to all the directors of the other companies, for the purpose of narrowing the discussions at the conference. The report of the sub-committee, which was appointed to draw up a draft of general regulations, to be proposed for general adoption, is as follows:—

"In considering the subject of the various accidents which have recently taken place on different railways, and the circumstances connected with each accident, it appears that they are attributable to one or more of the following causes:—

"First—The want, or insufficiency of signal lights, giving warning of danger.

"Second—Neglect on the part of enginemen of such signals, when given—comprehending a culpable want of care and vigilance, in not keeping a good look-out; and,

"Third—The difficulty of stopping a train when danger is perceived near at hand.

"On the subject of signals and signal lights, your committee are of opinion that the printed rules and regulations of this company, which have been brought under the consideration of many other companies, and, as your committee believe, now constitute the basis and tenor of their respective regulations, are, on the whole, well calculated to answer the purposes intended. One modification seems desirable, namely—that the red light, or the red flag, should in all cases, and under all circumstances, be viewed as a warning against danger. On the Liverpool and Manchester line, the red light and flag are at present used at the gate-houses to indicate that the Liverpool and Manchester second class trains are to stop to take up passengers; but blue lamps and flags will shortly be provided for that purpose, which will allow the red light and flag, afterwards, to be used only as a warning against danger, which your committee think should be a universal rule.

"Other lights and lamps have recently been suggested, as night signals on railways. Some experiments with the Bengal or blue lights have been made on this line; and the Eastern Counties' Railway Company have already introduced these lights, along with some portable rockets for policemen, into their code of night signals. Under strict regulations, it seems probable these lights may be used with advantage, as occasional and extraordinary signals; but the utmost care must be taken not to relax the vigilance of enginemen, by leading them to expect a glare of light sufficient to startle them into attention, before any particular caution or watchfulness on their parts is to be considered necessary; the best security in railway travelling being the unceasing vigilance and acknowledged responsibility of the man in charge of the engine.

"As to negligence on the part of enginemen, and

other servants on the railway, in not using due caution, and in not attending to signals when made, the committee can only recommend great care in the selection of active, steady men, in the first instance. Good wages, and a considerate regard to their comforts, so long as they do their duty; accompanied by the strictest discipline, and by uniformly putting in force the provisions of Lord Seymour's Act, in cases of any neglect of duty or disobedience of orders, hazarding the safety of life or property, although no loss of either should actually take place. Your committee are of opinion, that bringing railway servants, in case of serious misconduct, before a county magistrate, for summary judgment under the late Act of Parliament, has a very beneficial tendency, by impressing strongly on the minds of enginemen and others, that when a transgression is committed it is an offence not merely against their employers (the Railway Company), but against the community at large, of which the laws of the country and the authorities thereof will take prompt and severe cognizance.

"And your committee will mention in this place, the importance of an explicit understanding amongst different companies, not to take into their employment, respectively, discharged servants from other companies, or any servants having worked on other lines, without authentic and satisfactory testimonials from their last place.

"With respect to the third point under review, the difficulty of promptly stopping trains when danger is perceived; the most efficient means hitherto employed are immediately to reverse the engine, and put on the tender break. Great care should be taken by the engineers, that the reversing gear is of the most approved construction, not liable to get out of order, and which cannot fail to act when the reversing lever is applied. The breaks, both of the tender and carriages, require constant attention, and they should be sufficiently powerful to enable the man who attends them, to lock, without difficulty, the four wheels of the carriage to which they are applied.

"With regard to the numerous proposals of improvements, and schemes for the prevention of accidents by mechanical means, if that unceasing vigilance, which cannot be too strongly insisted upon, on the part of the engine-driver, should be at any time relaxed, those who have been long conversant with the practical working of a railway can hardly be aware how many of them have been long since, and under various forms, already tried, and found to be attended with risks and inconveniences more than compensating for any supposed advantages. Experiments of this kind, in the success of which railway companies are so deeply interested, are perpetually going forward, and some further improvements may, it is hoped, by degrees be generally introduced; but alterations of such vital importance in their consequences, ought never to be introduced in practice on the large scale, without considerable extent of trial and cautious experience of their practical working.

"One new arrangement with a view to the safety of railway travelling, has been so publicly discussed and recommended, that your committee cannot pass it over in silence; it is, that on each engine there should be not only the engineman and fireman to work the engine, but a conductor of a higher standing and superior acquirements, whose special business it should be to look out, and under whose orders the engineman should act.

"Your committee decidedly deprecate the idea of relieving the engineman from the responsible charge of his engine, and consequently of the train to which it is attached. But every care should be taken to get steady drivers, and more care than has, perhaps, usually been exercised in the choice of *firemen* or *stokers*. This class of servants, your committee are of opinion, should be somewhat raised in importance in the scale of railway service. No fireman should be employed under 21 years of age, and a stricter scrutiny into respectability of character and steadiness of conduct should be instituted than they apprehend has hitherto taken place. A man of this description, after a few years' service, would be prepared by ample training in the most effectual school, to take the higher place of engineman, and a steady engineman with such a fireman, your committee are of opinion, is the proper party to have charge of the engine. It is admitted that the safety of the train depends very much on the proper conduct of the man who has the responsible charge of the engine. The question, therefore, as to the most competent conductor, should receive the fullest consideration. Your committee, however, would apprehend the most imminent danger from any ill-advised change in the present system. What is required is constant vigilance—and there is no evidence in reference to any of the accidents which have taken place, that the exercise of this qualification on the part of the engineman is incompatible with his other duties; no such plea has been made, and there is no reason to suppose that any such difficulty has been felt.

"By introducing another man on the engine, you have another pair of eyes to *look out*; but this advantage, if it be one, might be more than countervailed by the divided authority and responsibility which must inevitably take place, for the engineman must still be responsible for the working of his engine, and cases of difficulty or danger might occur, requiring the utmost promptness of decision; as, for instance, whether to *push forward* or to *reverse* the engine; and who, in such cases, would decide? Jealousy and disunion, it is to be feared, would frequently arise. These would be destructive of confidence in their own resources, to the men themselves, and fraught with danger to the whole train. As to the necessity for superior acquirements or professional skill, there is no evidence of a single accident having occurred owing to the want of these qualifications. The desiderata are *constant vigilance* and *presence of mind in emergencies*; and your committee are of opinion that no man, however professionally competent, ought to be trusted with the charge of an engine, till he has served an apprenticeship to the business, and has thus become familiar with the rapidity of the locomotive engine, and its consequent excitement—with its severe exposure to the weather—with the customs and practice of railway operations, and with all the contingencies of locomotive transit regarding police regulations, signals, &c.

"The above observations are what have occurred to your committee on the subject referred to their consideration. They are offered with a view to being submitted along with the printed rules of this company to other managements, in order that the whole matter of railway regulations may undergo candid revision; and some general agreement may be afterwards come to, calculated to benefit railways, and to give increased safety and confidence to the public."

TO CORRESPONDENTS.

We have no means at present of ascertaining the question of T. P. S. An approximation to the amount could, under any circumstances, only be attained.

The Steam Coach Company will be noticed next week.

J. W. is correct. The amount of force required in the case supposed, would be equal to that of a ten horse engine.

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 18 ARE NOW READY.

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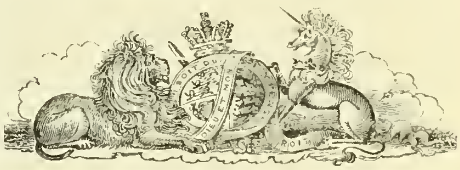

THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, JANUARY 9, 1841.

The INDEX *and Title Page for the Third Volume of the* INVENTORS' ADVOCATE *will shortly be Published, to enable Subscribers to have their sets bound. The present number is the First of the Fourth Volume.*

The directors of railways in all parts of the kingdom, impressed with the importance of adopting some more effectual regulations for the prevention of accidents, have determined to hold a conference, at which delegates from the different companies are required to attend. The experience gained in working the different lines of railways will thus be concentrated, and the results of the experiments which have been prosecuted by many of the companies will be made known and compared. From this conference, therefore, the most important practical results may be expected to follow, by which means the new mode of travelling may be rendered more free from danger; and the peculiar facilities it presents for increased safety may be made available. Much, however, will depend on the mode in which the deliberations at the conference are conducted. The delegates should assemble with minds open to conviction; willing to consider and

test the merits of any proposition that may be made, which appears likely to add to the safety of railway travelling; and not go there with a set of fixed opinions, and views narrowed to existing modes of practice.

We observe with regret that a sub-committee of the Manchester and Liverpool railway company have issued a report for the professed object of "narrowing the discussions at the conference," in which they mention first, the circumstances to which the various accidents that have recently taken place on railways are attributable, and then proceed to state the remedies which they propose for future prevention. The causes assigned by the committee are limited, and only embrace a few of the causes of danger in railway travelling. They are,

"First—The want, or insufficiency of signal lights giving warning of danger.

"Second—Neglect on the part of the engineer of such signals when given—comprehending a culpable want of care and vigilance in not keeping a good look-out; and

"Third—The difficulty of stopping a train when danger is perceived near at hand."

We have given, in another column, the suggestions of the committee on each of these points. Generally speaking, they are calculated to improve the present method of working, and, by introducing a uniform system on all railways, may prevent liability to confusion from variance of signals. The recommendations, however, it will be perceived, are of very limited extent. They have no reference to the mechanical arrangements of the locomotive engines, nor to improvements of the rails or carriages; they are chiefly confined to the regulation of the signals, and the appointment of the engineers and stokers. The reforms they suggest are the least possible that could be proposed, and if the conference do no more than is thus set down for their guidance, the delegates will disappoint the expectations raised by their meeting, and the result of their combined deliberations will appear to the public like that of the mountain in labor.

A large portion of the committee's report is taken up with stating their objections to the suggestion first proposed in the INVENTORS' ADVOCATE, of appointing a superior conductor, or captain, to the command of each train. This suggestion, which was subsequently recommended in the *Times*, and other journals, and was recommended, almost in our own words, by the coroner's jury at the Harrow inquest, appears to have made so much way in public estimation, that the committee feel it necessary to bring the artillery of false reasoning, and misrepresentation to bear against it. We conceive, however, that all their endeavors to prove the plan proposed defective, have signally failed to make the least impression upon it.

The objections urged by the committee to the appointment of a superior conductor, or captain, are briefly these:—That it would tend to relieve the engineer from the responsible charge of his engine; would produce divided authority and responsibility; and give rise to frequent jealousy and disunion; the effect of which would be, to destroy the confidence of the men in their own resources, and to endanger the whole train.

We are perfectly ready to grant, that if a conductor were appointed of equal authority with the engine-driver, the evils which they predicate might arise; but such a supposition is entirely at variance with the plan we suggested. The captain of the train would have the sole control. There would be no more danger of disunion between him and the engineman, than there is of disunion between the captain of a steam-ship and his engineer. All the latter has to do is to attend to his engine, to have it constantly in perfect order, and to be ready at an instant's warning to obey the commands of the captain. So it should be with the engineer of a locomotive, in his relation to the captain of a railway train. The engineer, instead of being "relieved from the responsible charge of his engine," as the committee gratuitously suppose, would have his attention soloty directed to that object, without having it diverted, as at present. The committee observe, that the desiderata in the conductors of the train are, *constant vigilance*, and *presence of mind in emergencies;* and these desiderata we propose to attain by the appointment of a person of superior ability, intelligence, and education—a man who has a standing in society to maintain, and a character to lose—to the sole duty of keeping a look-out, and giving orders suitable to any emergency to the engineer, who, himself unconscious of the extent of danger, can execute the orders given with the utmost self-possession. The points, therefore, on which the committee insist as essential to the safety of a railway train in rapid motion, are those which can be best attained by the regulation which they deprecate. They assume a plan of arrangement which was not contemplated, and raise a host of objections against it; but, at the same time, every one of those objections is an argument in favor of the plan really proposed.

We have reason to believe that the committee are mistaken in their representation of circumstances connected with the recent accidents, as well as in their representation of the plan proposed by ourselves. They assert that "there is no evidence, in reference to any of the accidents which have taken place, that the exercise of this qualification (vigilance) on the part of the engine-man is incompatible with his other duties; no such plea has been made, and there is no reason to suppose that any such difficulty has been felt." This assertion is contradicted by the evidence given at the inquest on the body of the engine-driver at the Faringdon station of the Great Western railway; when it was stated, that the engineer was attending to his engine just before the time of the accident. We have also the authority of a distinguished engineer, who has frequently accompanied locomotives on railways, for stating that the engine-driver not unfrequently fails to observe the signals of the policemen on the road, owing to his attention being directed to the state of the engine. At the velocity with which the train usually moves, it is impossible to observe a signal unless seen at some distance in advance, and in a second of time, whilst the engine-driver is merely looking at his fire, or at the state of his boiler, the signal is past unobserved. The necessity of constant vigilance which the committee enforce seems, indeed, quite incompatible with the responsible charge of the engine, which they also consider essential. It is quite clear that if the engine require any attention at all, the "constant vigilance" on the look-out cannot be observed whilst that attention is given. It is also certain, that if the engine-driver's duties were entirely confined to his engine, they would be better discharged than when he is obliged to be always looking forward to detect danger.

By the appointment of a superior officer, with complete command of the engineer and train, the division of authority, the jealousy, and the other evils which the committee deprecate, would be entirely avoided instead of being created; the two incompatible duties of attending to the engine and to the road would be divided; and by placing a man of character and intelligence in command of every train, the chances of danger would be diminished; the passengers would feel increased confidence; and the railway companies themselves would, in the end, be amply recompensed for the additional expenditure which such an arrangement would in the first instance occasion. We trust, therefore, that, at the approaching conference, the subject will be freely and liberally considered, and that the proposed appointment of captains to each train will not be prejudiced by the erroneous views of the sub-committee of the Liverpool and Manchester Railway.

NEW INVENTIONS.

BLASTING BY GALVANISM.

The new plan, proposed by Mr. Martyn Roberts, of blasting rocks and mines by the application of galvanism to explode the gunpowder, is detailed by him in a letter just published, addressed to the Agricultural Society of Scotland. This process of exploding gunpowder by galvanism has been in some degree familiarised by the practice of it by Col. Pasley, in his operations to blow up the wreck of the Royal George. This mode of operating, however, Mr. Roberts also claims as his own. By applying it to blasting it offers many and peculiar advantages. In the first place, it prevents all danger from the fuse firing the gunpowder before the man who lights it has time to escape. It enables all the men to remove to a place of safety before the explosion, and it determines, to a moment, the time at which the explosion takes place. One great danger of blasting by the common process is, that the fuse frequently hangs fire; and the men, supposing that it has gone out, approach the mine as it explodes, to their certain destruction. The plan adopted by Mr. Roberts, of charging the hole with gunpowder, and closing it with loose sand, is extremely curious, and involves a principle that deserves further consideration. He finds that by merely filling up the hole with dry sand, instead of ramming it up with pieces of stone, the explosion is as effectually confined within the orifice as if it were rammed down in the tightest manner. After putting half the required quantity of gunpowder into the boring in the rock, he introduces the insulated wires, which are to be afterwards connected with the galvanic battery. To make the action more certain, he forms small tin cartridges; inside of which the wire that is to explode the powder is adjusted. The remainder of the powder is then put into the hole, but not rammed down. A piece of wadding is then thrust into the bore, to within a few inches of the powder, and the hole is merely filled with some dry sand. By connecting the ends of the two wires with the galvanic battery, placed at any distance, the fine piece of wire inside the cartridge becomes red hot, and the gunpowder explodes. There is a great saving of gunpowder by this method of explosion, for in the old method of thrusting down a straw filled with powder, or a fuse

to communicate with the gunpowder in the bore-hole, a quantity of the exploded powder was blown out, and its force diminished.

THE ANEMOMETER.

Meteorology has long stood in need of self-registering instruments for the purpose of correctly recording the facts and pheuomena of wind and rain. An ingenious machine of this kind (called by its inventor, Mr. Follett Osler, of Birmingham, the anemometer), which has been some short time in preparation at the Royal Polytechnic Institution, was on Thursday put into operation at that establishment. Its object, as its name implies, is to indicate the direction and force of the wind, and this is accomplished by means of a vane of peculiar construction, which is placed above the roof of the building, and is made to communicate by means of a rod or tube with the machine in one of the apartments below. At the lower extremity of this tube is a small pinion working in a rack, which slides backwards and forwards as the wind moves the vane. To this rack a pencil is attached which marks the *direction* of the wind on a paper having thereon the cardinal points, and so adjusted as to progress at the rate of half an inch per hour, by means of a clock. The *force* of the wind is at the same time ascertained by a plate one foot square, placed at right angles to the vane, supported by two light bars, running on friction rollers, and communicating with a spiral spring in such a way that the plate cannot be affected by the wind's pressure without instantly acting on this spring, and communicating the amount of its action by a light copper wire passing down the centre of the tube to another pencil below, which thus registers its degree of force. By means similarly ingenious and simple, the time at which any rain falls is accurately determined, as well as the amount and mode of falling. The importance of self-registering instruments for obtaining a sufficiently extensive and accurate record of meteorological facts will be admitted by all; and the directors of the Polytechnic Institution have in this, as in many other instances, given satisfactory proofs of their care for the interests of science as well as their own. The anemometer may not attract the notice of the multitude, but it will assuredly arrest the attention and provoke the inquiry of the ingenious and the learned.—*Morning Post.*

IMPROVED LOOM.

A machine has recently been added to the mechanical department of the Salford Mechanics' Institution, which promises for it a great increase of attraction. It is an invention of a gentleman of this town, aud is called a Jacquard apparatus. When appended to looms moved by power (as in the present instance), or otherwise, it is capable of producing either on light or heavy fabrics not only a greater variety, but also a wider and more extensive range of pattern than any other kind of loom; it makes a top and bottom shed of any required depth, without the aid of weights aud springs being attached to the healds. The design is formed, and may be varied at any moment by the application of paper cards, or wooden logs and pegs. It will weave with any number of shafts, from 2 to 30; and any length of pattern, up to 5,000 picks, may bo produced by it. The invention is a very important one to manufacturers. Other articles of interest have likewise been added to the collection within the last few days, but our limits at present prevent us from adverting to them.—*Manchester Guardian.*

AMERICAN LOCOMOTIVE ENGINES.

The following letter appeared in the *Times* yesterday:—

"Sir,—It must be a matter of deep regret to all interested in British machinery to learn that the Birmingham and Gloucester railway company have purchased ten locomotive engines made in the United States. What I complain of is the reflection or stigma cast upon the manufactories of this country. Long has Great Britain stood pre-eminent above other nations in the invention and great superiority in the manufacture of engines and other articles of machinery. It is entirely owing to the undoubted excellence of the machinery of this country that we are able to compete with foreigners, notwithstanding they possess the advantage of cheap food, and, consequently, low wages. But it is to be hoped that good may arise from it; that it will incite our mechanical men to greater application, which may tend to some important improvements in locomotive engines.

"I cannot avoid mentioning the great apathy and indifference evinced by our most eminent engineers at the frequent fatal railway accidents. Surely it would be more creditable to commence some systematic improvement for the safety of the public than remain passive until Government make such measures restrictive and compulsory.

"Newcastle-on-Tyne, Jan. 4."

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING JANUARY 11, 1841.

Monday,	Geographical Society	9 P.M.
	British Architects	8 P.M.
Tuesday,	Medico-Chirurgical Society	8½ P.M.
	Institution of Civil Engineers	8 P.M.
	Zoological Society	8½ P.M.
	Architectural Society	8 P.M.
	Royal Botanic Society	8 P.M.
	Meteorological Society	8 P.M.
Wednesday,	Society of Arts, (Illustration)	8 P.M.
	Graphic Society	8 P.M.
	Medico-Botanical Society	8 P.M.
Thursday,	Royal Society	8½ P.M.
	Antiquaries Society	8 P.M.
	Royal Society of Literature	4 P.M.
Friday,	Botanical Society	8 P.M.
Saturday,	Asiatic Society	2 P.M.
	Medico-Botanical Society (Anniver.)	8 P.M.
	Westminster Medical Society	8 P.M.
	Mathematical Society	8 P.M.

BOTANICAL SOCIETY OF LONDON.

Jan. 1. Dr. H. A. Meeson, in the Chair.

Specimens of *Bupleurum Odontites*, from Torquay, Devon, were presented by Mr. T. Sansom, received through Rev. W. S. Hore. The president presented the nut known as the vegetable ivory of commerce (*Phytelephas*), which is used when turned, on account of its compactness and hardness, for various purposes in the arts, such as handles of umbrellas, &c.; it is the produce of a tree, native of South America. The curator stated that it was one of the hardest forms of vegetable *albumen* with which he was acquainted, even surpassing the seed of the date. This hardness was supposed to be owing to some peculiar arrangement of the cells of the cellular tissue, of which it is exclusively composed; chemical examination aided by microscopic investigation are the only means of fathoming the cause of this excessive hardness in vegetable structure. A paper was read on the "Necessity of the Rotation of Crops."—The fact known to husbaudmen, that land will not yield good crops if it be sown with the same species of plant successively, has beeu a fact handed down for many ages; and it is strange that so little attention has beeu paid to the subject, which must be considered of paramount importance. The opinion generally given in explanation is, that vegetables not only absorb from the soil nourishment fitted for their support, but that they also give off or excrete matter from the roots, which is not required to nourish the plant. When land is successively sown with a plant of the same species, the earth becomes full of this excreted matter around it. The great object the farmer has in view, is to vary his crops, so that tho plants which succeed the former crop possess the means of assimilating tho excreted matter of thoso which preceded.

Considerable discussion ensued as to the validity of the opinion of Decandolle, and various arguments were brought forward to prove that the views entertained by Braconnot are not altogether conclusive. Various experiments were proposed with a view to give the subject further trial, which were duly considered, and a member present stated, that it was his intention to communicate a paper to the Society, in the course of the ensuing summer, on this interesting subject.

Mr. D. Cooper presented the Society with specimens of a *Hygroscopic plant* from the Cape of Good Hope, the *involucra*, or scales, of the calyx of which were of a membranous character; these remain while the parts of the flower wither away, thereby constituting what is usually and popularly termed an *everlasting flower*. In dry weather these scales open, and in a wet or damp atmosphere they close up. There are many plants possessed of this property, which is attributable to the peculiar structure to be found in the scales themselves. The meeting then adjourned until the 15th inst.

ENTOMOLOGICAL SOCIETY.

Jan. 4. Rev. F. W. Hope, F.R.S., President, in the Chair.

The President stated that he had, on a former meeting, asserted that Sir R. Ker Porter had mentioned extraordinary flights of buttsrflies in South America. On reference to his notes, he found that he was in error, and that the account is given in Holme's History of Buenos Ayres, of the migration of butterflies to a very considerable extent. Mr. Westwood made some observations on an error he had discovered in a former part of the transactions of the society connected with the larvæ of the genus *Melo*. The secretary also read some observations on the genus *Sphex*, belonging to the Fossil Hymenopterous order of Latreille. The paper lead to much scientific discussion. The president stated that the Egyptians were doubtless acquainted with this tribe, as from drawings which Mr. Wilkinson the Egyptian traveller had shown him, he could recognise four or five very nearly allied genera; they are also to be met with on sculpture. The genus is mentioned by Plutarch, who states that it is bred in horses. This however was asserted to be an error; from which it is concluded that it must have included those flies generated in those animals. Considerable discussion ensued as to the propriety of changing nomenclature in natural history, and the confusion it makes in the science, by adopting names in zoology that have been used in botany, and vice versa. It was stated that Agassiz and Decandolle of Geneva had taken the pains to ascertain the number of times to which names had been given for the same animal or plant. Agassiz found that in zoology, upwards of 800 genera had been named twice; while in botany, Decandolle found upwards of 300. Fabricius, the celebrated entomologist of former times, was so much at a loss, so it is supposed, to find names for new insects, that he named some of the most curious after the towns mentioned in the Acts of the Apostles. The meeting adjourned until the anniversary meeting, 25th inst.

GREENWICH INSTITUTE.

Dec. 30, 1840.

Mr. Samuel Birch, senior assistant iu the Antiquity department of the British Museum, delivered an interesting lecture on "the system of writing developed by the ancient Egyptiaus"—which was stated to offer considerable differeuces from that of every other system of writiug, adopted either in tho ancient or the modern world. The principal part of his discourse embraced an examination of the peculiar mode of conveying ideas adopted by these people, which must be considered the very first boon of antiquity; to give our readers this part of the subject would require characters to illustrate the various hieroglyphics.

The lecture was prefaced with remarks on the structure of languages in general. It is generally supposed among persons who have made the machinery of languages their particular study, that all

the original attempts of mankind to record the events of their race, subsequently to the adoption of poetry and oral traditions, must have been, by the means of pictorial images, rudely sculptured on the rock, or traced with rough materials on the walls of their abodes. The arts of sculpture and painting have finally claimed this especially for their province, and this tedious and imperfect method—vestiges of which still linger among nations, who either have never attained a high civilisation, or from local causes have had their civilisation suddenly arrested—rapidly gave way for a more compendious process. This was probably the abridging of forms, and indicating the meaning to be conveyed by reductions of the original type. Still, however, language must have crawled; the finer developments of parts of speech still being wanting, and the war chaunt of the bard, the popular tradition handed down, and distorted in passing as it were through so many prisms, have still remained the principal means of preserving the fleeting memorials of the human race.

The two great rivers of language from which the dialects of the world have flowed down in tributary streams, offer nine centuries at least before our era —a mode of writing similar to our own. All the manipulations are expressed by a number of abstract marks, commonly called letters of the alphabet, which represent sounds; and the Invo Germanic and Semitri branches had thus acquired their ultimate development, so distinguished for its perspicuity, simplicity, and flexibility, that the period of nearly three centuries found out no improvements to the original plan. The alphabetic system marches side by side with the spoken language of every country; expresses with the greatest facility its inflections; is soon acquired, based, as it is, upon the modes of expression prevalent in the mouths of all. Far different the mode of writing adopted by the children of Mitstraim! Instead of some six-and-thirty or twenty abstract marks, intended for sounds, a variety of symbols — among them are the human form, celestial objects, stars, suns, moons, quadrupeds, as oxen, cats, lions, birds, hawks, eagles, vultures, &c.,—fishes, as carp and a species of pike—flowers, as the lotus, &c., geometric signs, plans of edifices, &c. These are the objects by which the Egyptians handed down the records of their race, and from the heaven-capped Colossus to the smallest amulet —the temple and the tomb—the obelisk, piercing the vault of heaven, and the broken fragment at its base,—are all covered with the various combinations of these symbols!

From the earliest period of the nation till the downfall of Paganism, the language had been expressed by these symbols; but the gradual substitution of the language of its conquerors for that of the country in public documents, had extinguished the knowledge of these ancient monuments. Two fathers of the church, Clemens Alexandrinus and Porphyry, make mention of them in such a manner as is evident that the interpretation of them was rapidly vanishing, and the dark ages, which buried human learning in the cloister, enveloped in Cimmerian gloom the history of hieroglyphics. After Caracalla there are no monuments. The art of painting and engraving the sacred characters was, indeed, rapidly disappearing under Adrian, and no knowledge of these documents, except the odd mixture of Paganism and Christianity professed by the Gnosti and Basiliorans, was extant in the age of Constantine.

The revival of literature and the arts had, however, its effect on Egyptian antiquities. The efforts of Greek ideality had already occupied the attention of a Michael Angelo, or a Raffael; Greek and Latin literature was extensively cultivated, and often mention the source from which, without doubt, much of its mythology was acquired, and a few Egyptian objects had strayed into the cabinets and collections of distinguished antiquaries. The obelisks with which Rome is decorated had been made more than once the serious subject of disquisitions, but the first principles of the study were wanting, and the pretended translations of the Jesuit Kircher manifested the most audacious empiricism, and lamentable self conceit—nothing except what had been ransacked from the Greek or Latin authors was known of the meaning of these symbols, until the discovery of the *Rosetta-stone* in 1790, by M. Bouchard, an officer of engineers in the French army, at that time occupying Egypt. This monument contains a tryrammatical inscription in Hieroglyphios, Greek, and Euchorial, in the last of which it is expressly stated, that the decree is ordered to be set up in the three languages. This inscription consequently became the very touchstone of the question, because here was a monument executed under the Ptolemies with its translation in a known language; the only difficulty with regard to it was its mutilation, and the natural difficulty of determining in what manner the analysis should be conducted.

ROYAL DUBLIN SOCIETY.

The following are the propositions sent by the Irish Government for the regulation of this society. They are to be taken into consideration on the 14th inst.:—

"I.—The society to consist in future of two sections, having the house, library, theatre, museum, &c., in common.

"1. The object of one section to be the promotion of chemistry—natural philosophy—geology and mineralogy—zoology, together with any other kindred branches of useful knowledge.

"2. The object of the other section to be, the promotion of agriculture—horticulture and botany —manufactures—fine arts—statistics; together with any other kindred branches of useful knowledge.

"II.—The members of each section to be elected in the mannor which is now observed in the society. But instead of the present payment of 21*l.*, the admission fee to each section to be 1*l.*, with an annual subscription of 1*l.*, or a life composition of 10*l.*

"III.—1. Each section to elect annually, by ballot, a council of 23; of whom one to be president, five to be vice-presidents, two to be secretaries, and one to be treasurer of the section.

"2. Five members of each council to go out every year, but to be re-eligible after one year.

"3. The president to be eligible for two years in succession; but not to be re-eligible till after the interval of a year.

"4. Two of the vice-presidents to go out of office every year, but to be re-eligible into the council.

"5. Each council to furnish to its section at the annual meeting a list of the persons it would recommend to be elected as the council for the ensuing year.

"IV.—Each council to manage the affairs of the section, and appoint all paid officers and servants exclusively attached to the section, subject to the approval of the members of the annual meeting.

"V.—Each council to subdivide itself into as many committees as it has distinct objects, and to have power to add three members of the section to each committee, if deemed necessary.

"VI.—Each council to contribute an equal number of its members to form a general committee for the management of the house, library, &c., and the appointment of all paid officers and servants attached to the society at large.

"VII.—1. The parliamentary grant to be divided between the two sections of the treasury, in proportion to the amount of the subscriptions.

"2. Each council to apportion its share amongst the committees.

"3. Each council to make an annual report of its proceedings, and to include in it a detailed statement of its expenditure.

"VIII.—1. Each section to meet annually to receive the report of its council for the past year, to elect the council for the ensuing year, and to transact any other general business.

"2. No other meeting of the section for general business to take place, except on the requisition of at least thirty members.

"3. Each section to meet for scientific or other instructive purposes, and for the election of members, as often as it may think advisable.

"4. No motion affecting the constitution or general interests of the section or society to be made at the annual or any special general meeting, except upon a month's previous notice in writing.

"If the two sections do not agree upon any matter of common interest, the question to be decided by majority of voices, upon a union of the two sections.

"IX.—No news-room or newspapers to be permitted in the house of the society."

CONSERVATOIRE ROYAL DES ARTS ET METIERS.

(*From the Moniteur Universel.*)

On the 22d of November last M. Charles Dupin commenced the opening of his course at the Conservatoire, in the midst of a most numerous and brilliant audience.

He discoursed on one of those subjects which are most important to national industry, and to the concord of the various classes of the French people. He proposed to show, by great statistical results, skilfully compared, the progressive well-being of those various classes, and, above all, of the laboring classes.

We regret that the length of this remarkable discourse only enables us to give an extract. We confine ourselves to the last portion, which produced a deep impression upon the numerous artificers, who listened to it in solemn silence:—

"Few individuals ever attain the term of life assigned by nature; with some misfortune, with others misconduct, with almost all various passions, abridge the period of existence. On the other hand the more that order is introduced into society, the more that labor becomes fruitful, the more that arts brought to perfection multiply useful productions, the more also is the life of mankind prolonged, and the measure or proportion of this life becomes also that of the national prosperity. Before the French revolution, from 1770 to 1790, there died, on a yearly average, the 30th part of the population; at present, only the 40th part. This shows an increase of ten years upon the average length of the life of Frenchmen.

"Never, in half a century, has so vast a progress been caused by the prosperity of an entire people.

"In order to arrive at this admirable result of increasing by a third the length of human life in the space of half a century, discoveries in science whereby to render less dangerous and more salubrious a host of professions have been necessary; the discovery of vaccination, whereby to save the lives of a great number of children, has been necessary; the employment of ingenious machines to exempt man from labors most dangerous and most overwhelming has also been necessary; as well as the perfection of hospitals, the increase of out-door relief, and all the benefits of which I have feebly drawn a sketch.

"How guilty are those men who, seeking to trouble the peace of society, pour into the hearts of the working classes all the poisons of discord and of hatred against the leading men who make industry prosper! Careful as they are to confine themselves to vague declamation, these men take good care not to come to positive calculations, which would immediately prove the sophistry of their conceptions, and the falseness of their promises.

"It is for us to borrow from statistics simple and easy refutations.

"France, now the richest country on the continent of Europe—France, in reuniting the gain of each and the produce of all labors, presents an annual revenue of ten milliards of francs.* These ten milliards, divided equally amongst 34,000,000 Frenchmen, would give to each 80 centimes per day. Consequently, if they were able to realise their dreams of agrarian laws, if they proceeded to an equal distribution of the products of industry amongst all Frenchmen, the portion of each,

* A milliard is one billion.

whether great or little, strong or weak, idle or laborious, would amount to only 80c., but on the condition of furnishing 80c. of labor in order to obtain these 80c.!

"But out of these 80c. the general administratiou of the kingdom and the municipal administration retain, with an admirable punctuality, 12c., in order to provide for the 15,000,000,000 or 16,000,000,000 of duties and *octrois*, &c., which are deducted every year. This deduction made, there would only remain 68c. for the portion of each individual.

"Do you imagine that for 68c. per day you will obtain those profound studies, those unheard-of efforts of imagination, of calculation, and invention, which are necessary to the progress of the useful and fine arts?

"To confine ourselves at present to those *chefs d'œuvre* of which the nation is so proud, do you imagine that for 68c. a day, such painters as Vernet, Ingre, Laroche, and Pujol; such sculptors as Bosio, Corlot, David, and Pradier; such engravers as Desnoyers, Galle, Tardien, Richomme; and such architects as Fontaine, Percier, Soufflot, Brogniart, &c.—do you imagine, I say, that all these could produce the *chefs d'œuvre* which perpetuate and popularise the finest reminiscences of the national glory?

"But what need is there for me to recall here the great artists to which France owes its finest works of art?

"Not only would the mates, overseers, and stone-cutters, &c., in architecture, and the rough hewers in sculpture, refuse to concur in similar works for the miserable country of equality, the trumpeted element of universal happiness; but the simple cutters of stone, the good carpenters, the good joiners, the good founders, would refuse to sell their practical talents for these humble wages of handicraft.

"In Brittany, in Auvergne, and many other provinces, the day's work of a man in health is hardly worth, in the interior of the country, 70 centimes; that of the women, one-half; that of the children from 10 to 15 years old, almost nothing; and that of the other children nothing at all; you will comprehend that in those regions the average wages are much beneath 68c.

"But at Bordeaux, at Marseilles, at Rouen, at Paris, where the day of the workman is worth at least 2f., and that of the woman 90c., the average portion of the ordinary workmen far exceeds the 68c. for themselves, and their children, and their wives as well!

"In Paris the following trades gain per day:—

Journeymen bakers	3 francs.
Hall porters	4
Carpenters of the first class ..	4
Skilful printing compositors ..	6
Cutters out of clothes........	15
Very skilful clockmakers	20

"After this, if they wished to be consistent, they must begin by saying to the workmen of Marseilles, Bordeaux, Rouen, and Paris, 'You are the aristocracy of workmen, and the Bretons, the Limousins, and the Auvergnois, they are the people: down with your aristocracy!'

"Go and ask those industrious men whom society requites according to their knowledge and their physical strength — according to their skill and assiduity — ask them whether they would regard as a benefit, or only as a right, the 'equal distribution,' which would bring them down to 80c. and 68c. a head?

"We must then imagine to ourselves a social state, in which cities would be sacrificed to countries, in which departments, skilful in agriculture, eminent in industry, would be sacrificed to departments still plunged in ignorance and torpor; in which in every profession strength would be sacrificed to weakness, skill to awkwardness, activity to idleness, good sense to stupidity; and all this in order to give to justice a false lustre, by the desire of introducing into the social state a stupid equality, which a generous nature has refused to the human race.

"They may tell me that I am mistaken, that they only wish to destroy the aristocracy of manufactures and commerce, and are willing to let subsist the aristocracy of the working classes, like that of the great towns. Blind fools that you are! think you that you can suppress all the *bourgeois* of workmen, to raise in their place ancient simple workmen, who shall be the new *bourgeois*. Think you that you can annihilate the capitalists, without destroying the capitals? Think you that you can draw money from those who made it valuable by their intelligence, and divide it yourselves in imperceptible portions, without causing the commonwealth, pulverised by this barbarous process, to perish in the midst of the plunder?"

How will you replace the intelligent and wealthy man, who was able and knew how to assemble together from the four quarters of the globe, metals, wood, filaments, and the tar, necessary for the construction of a ship worth 500,000f., and which, by numerous voyages in the two hemispheres, will procure the exchange of foreign and native productions for more than 50,000,000 before this same ship is rendered, by long use, no longer sea worthy? I ask you, by what artificer at 80 centimes, will you replace both the builder and the owner of this admirable production of industry, and the accumulated capital necessary for the labor and existence of the carpenters, sailmakers, seamen, and a hundred other popular trades?

By what artificer, at 80 centimes, will you replace the engineer whom his talent and his capital have made the founder of a workshop where they manufacture steam-engines of 100, of 200, of 300, and even of 500-horse power? He requires a million's worth of buildings and tool-houses, in order to establish his workshop. Would you take this million out of your 80 centimes, were there even 100 or 200 workmen to create it?

In order to revive by commerce ten contiguous departments a railroad is necessary, which will cost 80,000,000f. A very small number of capitalists will suffice to defray this enormous expense, as soon as the Government shall grant its protection free from the spirit of monopoly and corporations, &c. I ask you, if you disperse, if you *atomize*, in such a manner capital by an infinite division, how will you manage with your 80 centimes to collect the 80,000,000f., without which, I repeat, this magnificent and productive means of communication can never be finished or perfected?

Thus you see that great workshops, grand constructions, &c., grand communications by sea and land, powerful mechanisms, rich voyages, and all the creations which a perfected industry is in a condition to accomplish with the benefit of accumulated capital, would all disappear by the false plan by which they propose to you to attain prosperity.

Thus, instead of reckoning on ten milliards a year, as the revenue of the French people, we must descend by rapid degrees to eight milliards, to six, to four, and perhaps lower still, which thus leaves to each of the co-dividers no longer 68 cents. (deducting the taxes, &c.) but 54, 40, 30, ay, and, perhaps, still less. Thus, the abasement, the impoverishing of the whole country, the reduction of the salary of each, the degradation of the entire people, would be the inevitable and immediate consequence of this absurd Utopia—this equal distribution of property, of revenues, and of salaries, being imagined a means of happiness and of prosperity for the whole of the people. Such would be the miseries which would weigh in common upon all points of the territory; but there are certain centres of industry which are now the pride of France, and which would fall still lower than the level of the general degradation. Reduce to this inflexible proportion of 68 cents. the daily revenue of each inhabitant, and it will be impossible for him to wear any other clothing but the coarsest linen, the most common calico, the roughest cloth. Adieu to all tissues of silks, satins, velvet, brocades, damasks, and the lighter tissues which so well ornament youth and beauty; farewell, consequently, to the means of existence of the superb Lyons, of Nismes, of Avignon, of St. Chamond, and of the three quarters of St. Etienne; farewell to the cultivation of the mulberry tree, which constitutes the wealth of Ardêche and the Drôme, of the Comtat, and of Provenco; farewell, now, to the lace, the blonds, the gauzes, the muslins, the cambrics, the shawls of Cashmere, which are even economically imitated by the national industry; there is an end of it! We must renounce all these elegant luxuries, and all the finest ornaments of a sex which is itself the ornament of a civilised people. Farewell, now, to the elegant equipages—what do I say?—to the simplest carriages, and even to the humble omnibuses; farewell to locomotive-engines, and their miraculous swiftness; farewell to the slow diligences, and even the rudest travelling vehicles; for all would become above the capacities of an impoverished people. Farewell to the majestic habitations; farewell to the simple apartment, in which, for a wise man, the union of comfort and good taste is sufficient; farewell to the sumptuous furniture, and all the delicate works of the clockmaker, the cabinet maker, the joiner, and the locksmith. Adieu to the carpets of opulence, to the graceful hangings, and the papers which so well decorate the small property; farewell to the bronzing, the gildings, goldsmithery, and jewellery: farewell, consequently, to the industrious pursuits which support the population of the great faubourgs of Paris, St. Antoine, St. Denis, St. Martin, Poissonière, and Montmartre; and the industrious quarters of the Marais, the Temple, the Palais Royal, and the ancient centre of Paris.

Here then at one blow the richest cities, the manufacturing towns, now the most opulent, in order to allow the people to take its share in the miserable division announced by the universal levellers, are all to lose their subsistence, in order to run in pursuit of wealth, and to meet ruin as the last portion of the senseless division which is promised them.

Oh! inexplicable mysteries of the impious struggle which the enemies of social order emulate each other in promoting. It is in Lyons and in Paris that anarchy addresses itself in preference to the laboring classes; it is there that it organises its plots: it is there that it cries up with success the interruption of labor and the absurd agreements between the master and the workman; it is there that it audaciously announces its plans of levelling, and its projects of division; and the cities which will be first completely ruined by the annihilation of a graduated scale of fortunes, are Lyons and Paris, whose workmen, more skilful than those of the rest of the kingdom, work for the opulence in which they participate by raising themselves to the highest degree in the scale of wages.

Such is the truth of these Utopian ideas, which would only merit contempt and pity if the terrible consequences of them were not the final misery and despair of those classes destined to live by their labor.

Equality in industry is the equal power of working, and of being remunerated in proportion to one's labor, to one's talents, and to one's probity.

Liberty in industry is the entire power of devoting one's self in all places to all those labors which are neither injurious to our fellow-citizens in particular, nor to the state in general.

Fraternity is not a vain animal equality, an absence of respect, of deference, and of gratitude between the subordinates and their superiors, between the workmen and the masters. It is not the privilege of smoking in the manufactory, or of chewing tobacco in the shop, at the hazard of infecting and staining the goods, and of frightening away the delicate purchaser. True fraternity is a generous affection of which nature developes the germ in all good breasts. It is a sympathy which makes us love our fellow-creatures, seek to be useful to them, to serve them, to enlighten them, to assist them in misfortune. This is true fraternity—a fraternity which, I presume to affirm, spreads its benign influence in the French workshops more than those of any other people, because the Frenchman is, of al men, the most sociable and the most humane.

SCIENTIFIC MEMORANDA, AND NOTES ON ART.

Plaster Casting.—Plaster of Paris is sulphate of lime, or gypsum, deprived of its water of crystallisation by heat. In this state it has such an affinity for water, and is capable of taking up so much, that when the powder is mixed with water till it becomes of the consistence of cream, it sets after a few seconds into a hard mass. In the manufacture of plaster casts, we must pay attention to several little niceties, in order to get rid of all the air bubbles. These arise from two causes, either from the adhesion of the air to the plaster, or from the plaster carrying down air with it, when added to the water. The first is to be remedied by using fresh burnt plaster, which is always adopted by the cunning stereotypers, for they state that if it simply stands a fortnight, the casts will not be so good. The workman cannot explain this, but the rationale was well known to Mr. Wyatt, our celebrated sculptor, who told me that he attributed it to the adhesion of the air; and that thus many delicate casts were injured. He places the common plaster in a saucepan over the fire, and heats it, when it heaves from the discharge of gas, and is then ready for use. Sufficient plaster should be placed in a basin, and water poured upon it till it is completely covered, and all bubbles cease to rise, when it must be thoroughly mixed by rubbing it together. The surface to which it is to be applied should be slightly brushed over with a very small quantity of salad oil. A little fluid plaster may then be poured on the cast, and with a hog's bristle painting brush thoroughly rubbed into all the fine parts, which will prevent the adhesion of any air bubbles in the plaster which might prevent a perfect impression. Another portion of plaster, sufficient to give the desired thickness is now to be added, and time must be given for the whole to set, when it should be removed from the mould, and gently heated to drive off excess of moisture.—*Smee's Elements of Electro Metallurgy.*

Improvement in Photography.—M. Fizeau has made such an improvement in this process, that the designs may be rubbed with the hand covered by a glove without being defaced. His method consists in employing a salt of gold. A liquid being formed of 15 grains of chloride of gold dissolved in three quarters of a pint of pure water, and 46¼ grains of hyposulphite of soda dissolved in an equal quantity of water, some drops of this fluid, after the light has ceased acting, are poured upon the silver plate, after the latter has been heated with great care. In this operation, silver is dissolved, and gold precipitated. This improvement was communicated to the Academy of Sciences on the 10th, and is said to be very important.

Fall of Aerolites at Milan.—On the 17th of July at seven o'clock in the morning, a loud detonation was heard, resembling a peal of thunder; and near Golosecca three luminous projectiles were observed, proceeding towards Somma, from east to west. The sound of the explosion extended for twenty or thirty miles round Milan. The largest aerolite was found near Ceresato, a village in the neighbourhood, having penetrated twenty inches into the earth. It weighed 10lb. 2 oz. The others were of smaller size, and fell near the larger one, but they have not been found.

Falling Stars.—M. Capocci, director of the Observatory at Naples, has related twelve cases of the fall of aerolites since 1809, about the 29th November of each year. The dates are as follows: 1809, 29th Nov.; 1810, 28th Nov.; 1820 29th; 1821, 30th; 1822, 28th; 1823, 27th; 1824, 27th; 1831, 26th; 1839, 29th. On the 26th of July last, he observed a great fall of stars.

On the Existence of Infusoria in Plants.—Rœper has shown that the cells of *Sphagnum obtusifolium* (Bog-moss) contain little openings into which the animalcule *Rotifer vulgaris* (wheel animalcule), under favorable circumstances, might enter. Morren has recently observed, with the aid of high magnifying power, that, in specimens of *Vaucheria clavata*, found at Everghem, he distinctly detected the same animalcule with its ciliæ imitating the wheel, &c. Morren, one day, opened one of these cells, and waited to see the animalcule spring out and enjoy the liberty so dear to all creatures, even to infusorial animals; but no—he preferred to bury himself in his prison, descending into the tubes of the plant, and to nestle himself in the middle of a mass of green matter, rather than swim about freely in the neighborhood of his dwelling.—*Abridged from Morren's paper on Ann. Nat. Hist. Jan.* 1841.

Tide Gauge.—The following description of a new tide gauge is given by Mr. T. G. Bunt, in the proceedings of the Royal Society, for March 22, 1838. The principal parts of the machine are an eight-day clock, which turns a vertical cylinder, revolving once in 24 hours; a wheel to which an alternate motion is communicated by a float rising and falling with the tide, and connected by a wire with the wheel, which is kept constantly strained by a counterpoise; and a small drum on the same axis with the wheel, which by a suspending wire communicates 1-18th of the vertical motion of the float to a bar carrying a pencil which marks a curve on the cylinder, or on a sheet of paper wrapped round it, exhibiting the rise and fall of the tide at each moment of time.

On the Growth of Trees.—M. C. Van Hall remarks, that by observations which he has made, and which are to be found in the Trans. of the Academy of Sciences at Amsterdam, the opinion entertained by Agardh, that trees increase in length in the first part of the summer, and in breadth in the latter part, is proved to be unfounded; and that they also show that the circumference of stems is not altered during the *six winter* months.

VARIETIES.

Murphy's Wonderful Weather Knowledge.—Mr. Murphy, the author of the "weather almanack" which was so successful a few years since, has now made a discovery which will supersede all such yearly indications, and will enable every one to predict the state of the weather, on any given day, centuries to come, at least if we may believe the published accounts. It is said, "he has made the discovery of what he calls a barometer of the season, by which the nature of the season of each succeeding year is not only accurately indicated in advance, but the nearest approach to the diurnal state of the weather in each season of which the subject wil admit may likewise be obtained; thus, by a short course, reducing to its most simple elements, the business of ascertaining in advance the nature of the seasons and change of the weather, and placing this complex department of physical science on a footing equally new as unexpected."

Vote of a Piece of Plate to the Chairman of the Blackfriars-bridge Committee.—The members of the Blackfriars-bridge Committee have determined to present Mr. Prior, the indefatigable chairman of the committee, with a piece of plate, commemorative of his exertions to make such improvements and repairs in the structure as have placed it amongst the most useful and elegant of modern metropolitan edifices. The following is the resolution to which the committee came, by acclamation, at a late meeting:—"Resolved unanimously, that it be recommended that the members of this committee should subscribe the sum of 50*l*., for a piece of plate to be presented to Jonathan Charles Prior, Esq., chairman, as a testimonial of the sense of the committee of his great services during the execution of the important works for the substantial repairs of Blackfriars-bridge."

Proposed Museum of Irish Antiquities.—A plan is now in agitation among the members of the Royal Irish Academy, for the formation of a Museum of Irish Antiquities upon the basis of the collection which was made by the late Dean Dawson. A circular has been sent to the members of the Academy for the purpose of promoting this object. It is proposed to raise contributions to purchase the collection of the late Dean of St. Patrick's. The circular observes:—"The want of such a museum has been of incalculable injury to the history of Ireland, has led to the destruction of many most interesting objects of ancient Irish art, and has been the remote cause of that disgraceful apathy towards our national antiquities which has, unhappily, characterised the gentry of this country."

New Fire Extinguishing Discovery.—A new method of extinguishing the fires which break out in theatres has recently been discovered. The inventor of it is M. Guerin, an old officer of the fire brigade of Paris. By means of this apparatus, it is said one man is able to prevent, or to extinguish the most raging fires.—*French Paper.*

A Blue Jacket's Opinion of Steamers.—If you wish to put an old sailor's patience to a severe test, although it is not quite fair, talk to him about steam-boats. It is his *questio vexata*—the hedgehog that he cannot help attacking, though he knows that he will suffer by it. He will tell you that this smoky, dirty craft will ruin all good seamanship, and put all valor and gallant bearing out of the world. Although he hates a steamer as a nuisance, and damns it as an impertinence, he has a secret and superstitious dread of it, and holds it to be a machination of the devil. Thus runs his opinion:—"While things was as they was, d'ye see, we blue jackets had it all our own way; for d'ye see, if Johnny Crapau fought, we wopped him; if he built more ships, we took them? And so Beelzebub grew spiteful; and ses he, whilst a British sailor gets his grog and his prog, d'ye see, I shall never be able to shove my oar in his boat, and turn the world topsy-turvy, d'ye see? So he plans with the teetotallers and the saints, and tries to disrate the grog-tub and promote the tea-kettle, d'ye see? But he could not do that job by halves, for which, d'ye see, may there be an eternal frost in his fire-place, and his coals run short. So, having partly failed, what does the devil do? Having got hold of the right hint, he turns the tea-kettle into a boiler—claps wheels to the ship's sides, as if they were no better than hackney coaches, or so many dung-carts—and thus ruins, d'ye see, the out-and-out blue water English sailor for ever. I've done it; says he, d'ye see; and I never hears one of these varmint steamers sputtering, fizzing, hissing, but I thinks I hear the devil a saying, 'Ah, Jack, you willain, I've done you at last!' d'ye see?"

Wood Paving.—The recent frosts have tested the wood pavings in the metropolis very severely, but with different results. That laid down at Whitehall, and in Oxford-street, and Fore-street, City, appears to have sustained no injury whatever; whilst the wood paving around St. Giles's Church, and in other places, has got out of repair, and is being relaid. Nor is the contrast less singular as respects safety, for the very sharp frost of last week made the wood paving opposite the banking-house of Coutts and Co., in the Strand, extremely slippery, so that horses have been frequently falling upon it, although that at Whitehall has been less affected than the macadamised road at either end of it, and is considerably more safe.—*Times.*

Absence of Manufactures in Norway.—There are no public manufactures in Norway; neither are they required, as each family supplies all its own wants, with the sole exception of articles of colonial produce. Of course everything on this system is necessarily made badly, and at an inordinate expense of labor in comparison with machinery; but then, that labor costs nothing, since it could not be otherwise devoted; and the employment is evidently beneficial in many ways. In every house there is a loom and working room; of which the sleepy traveller is too often reminded, early and late, by the incessant annoyance of its monotonous, jarring rattle. Every operation, from the production of the raw material to the last stage of its manufacture is performed at home. The women dress the flax of their own fields, and the wool of their own flocks, and spin it, and dye it, and weave it; transforming it afterwards into those substantial articles of clothing which are more suitable to a Norwegian climate than the elegant inventions of a Parisian milliner. Neither are the men idle. Every Bönder (for so the peasant proprietors, or yeomen, are called) is a tolerable shoemaker and tailor, and an excellent carpenter. Their houses, both internally and externally, are universally made and fitted up by themselves, with great skill and neatness. The winter, however, is not a season of unmitigated labor; if ever the Norwegian enjoys any relaxation it is then. The period about Christmas especially is the great time for merry-making, which, too often, I fear, degenerates into intemperance. And thus they pass the depth of winter.—*Two Summers in Norway.*

Fires in London in 1840.—The number and extent of the fires were greater last year than in any year since the year 1833, notwithstanding which the number of buildings "totally destroyed" is under the general average. The number of fires between the 1st day of January and the 31st day of December, 1840, amounted to 863. They chiefly originated in consequence of intoxication or carelessness by workmen. Out of the entire number, however, 204 fires had taken place in private houses. The number of fires that have taken place since the establishment of the fire brigade in 1833 amount to 3,628; the number of buildings totally destroyed, 195; seriously damaged, 957; slightly damaged, 2,482. The number of lives lost during the past year by fires was 22.

Spitalfields School of Design.—On Monday evening a preliminary meeting for establishing a branch school of design, in connection with the parent institution at Somerset House, was held at the All Saints' National School, Spicer-street. The Rev. Henry Taylor, the incumbent of the church, with many of the most respectable inhabitants of the district, were present, and upwards of forty pupils entered their names as students. It was explained by the Rev. Mr. Taylor that the payment was but threepence weekly, and that the ages of the pupils must be above nine years. The classes will meet from seven to nine on Monday, Wednesday, and Friday evenings. It was announced that the first lecture would be delivered by Mr. Dyce next Monday evening, at six o'clock, and that the models in the possession of the School of Design at Somerset House would be at the service of this infant society for the purpose of instruction. The school-room is very well fitted for the purpose, and is provided with slates and other materials for the use of pupils. Such an institution, although of the utmost importance to the manufacturing prosperity of the neighbourhood, has been hitherto unknown, and is one of the results of the energy of the worthy incumbent. It is gratifying to state, as one of the fruits of his labors in another cause, that the trustees with the whole of a congregation meeting in a room at Princes-street, on the verge of the district, in which divine worship was established by a dissenting minister recently officiating in the neighbourhood, have just joined Mr. Taylor's church.

Sieve to hold Water.—The following query has been submitted to our decision, and, fortunately, we can speak positively on the subject, in consequence of an experiment which we recently made. The question is,—"Will any kind of sieve hold water?" Our reply is, that a sieve of very fine wire, resembling very fine gauze, will hold water, and for a considerable time, but how long we are not prepared to say. Our correspondent may easily make the experiment, by procuring a piece of the finest wire gauze from any of the sieve-makers, and if he will make a kind of shallow bowl of it, like the hollow of the hand, and gently pour water therein, he will find that it will not pass through the sieve. If, however, the under surface of the sieve be wet, as well as the upper, the water will immediately pass through. The explanation is very simple. The water is attracted by the sides of the small apertures between the wires; and on this principle a very simple and cheap microscope, for temporary use may be made, by piercing a fine hole in a card with a needle, and letting fall a drop of water on that aperture, when the fluid will be arrested in its passage by the edges of the aperture, and the drop of water will assume a globular form, and act as a magnifying lens.—*Liverpool Mercury.*

The Silk-weavers in Spitalfields.—A few weeks ago some of the journeymen Spitalfields silk-weavers, being desirous that the silk trade should obtain the patronage of her Majesty and the nobility, resolved to execute a piece of workmanship from the Jacquard loom, in order to show that British skill was equal, if not superior, to that of the French weavers, and a design was invented, and a pattern of a portion of it produced, which attracted great admiration. Since then, in consequence of a communication to the Queen, through Lord Normanby, her Majesty has stated that she will patronise a fancy dress ball, the dresses of which are to be the produce of British manufacture. Several patterns of silks have been laid before the Queen for her approval.

Medical Reforms.—The College of Physicians have determined upon the abolition of the class of extra licentiates, and have agreed to liberalise the method by which the president and council are henceforth to be elected. The College of Surgeons have determined upon creating a new class, to be styled fellows. This class to be composed of the lecturers and recognised teachers of anatomy, physiology, and surgery, and of surgeons and assistant-surgeons to hospitals; and further, that this new class shall enjoy henceforth the privilege of electing one-half of their members of the council of the college.—*Medical Times.*

Export of Manufactured Goods to the United States.—The export of manufactured goods to the various ports of the United States, the revival of which we noticed some weeks ago, is now extremely brisk. The packet-ships to New York, Boston, Philadelphia, and Baltimore, have all had full cargoes, and the transient vessels now on the berth are likely to obtain fair freights. The New York packet-ship Virginian, now wind-bound, is not only crammed full, but had to refuse nearly 200 packages. Her freight reaches £1,700, the largest, we believe, made by any New York ship since 1838. The packet-ship North America, which will sail on Thursday, will also, it is expected, obtain a full cargo. The year opens well for trade, let us hope, therefore, that the export of goods will not only continue, but increase. —*Liverpool Albion.*

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Legal Observer.	Repertory of Arts.
Literary Gazette.	Spectator.
London Journal of Arts.	Smallwood's Magazine.
Magazine of Science.	Transactions of the Society of Arts.

ACTS OF PARLIAMENT.

PATTERNS,—
27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17. (The last relates to patterns and *models.*)

PATENTS FOR INVENTIONS,—
2 and 3 Victoria, c. 67.

SCULPTURES,—
38 Geo. III., c. 71.

ENGRAVINGS,—
7 Geo. III., c., 38; 17 Geo. III., c. 57.

COPYRIGHT,—
8 Anne, c. 19: 12 Geo. II., (Booksellers' Act), c. 36; 5 Geo. III. (Universities' Act), c. 53; 54 Geo. III. (General Copyright), c. 156.

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THE

INVENTORS' ADVOCATE,

AND JOURNAL OF INDUSTRY;

A WEEKLY BRITISH AND FOREIGN MISCELLANY OF

SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

No. 77.] SATURDAY, JANUARY 16, 1841. [PRICE FIVEPENCE STAMPED. CIRCULATING FREE BY POST.

STEAM CARRIAGES ON COMMON ROADS.

Can steam power be profitably employed in propelling carriages on common roads? This is a question deserving serious consideration; for if there exist any inherent impracticability in the plan, the sooner the attempts which are still making at great expense to carry the project into execution are abandoned, the more fortunate will it be for the speculators. If, on the contrary, it be found that the plan is feasible—that there is no insurmountable obstacle to the application of a power, which is cheaper than animal power, in all other cases, to draught by locomotion, it will be important to consider particularly the difficulties which have to be overcome before this cheap power can be rendered available for locomotion on common roads.

A committee of the House of Commons, appointed to consider the practicability of employing steam-engines to propel carriages on roads, reported in favor of the plan. They stated in their report, "that carriages can be propelled by steam on common roads at an average speed of ten miles per hour;" "that they are not (or need not be, if properly constructed) nuisances to the public;" and further, "that they will become a speedier and cheaper mode of conveyance than carriages drawn by horses." This report was made in 1831; nine years have since elapsed, and we seem farther from realising these promised advantages than at the time the committee presented their report.

Several steam carriages have been constructed, capable of travelling at double the speed mentioned by the committee; carriages that have ascended steep hills, passed over rough roads, and performed long journeys in different parts of the country; yet not one of them has been found able to compete with horse coaches on the same road in point of cheapness. The constant repairs required form one great source of outlay; and the amount of horse power which the engines are calculated to equal seems quite disproportioned to the effects produced. Mr. Gurney, Mr. Hancock, and Colonel Maceroni have each produced carriages that have accomplished twenty miles an hour, and have ascended hills nearly at the same speed, but one after the other they have quitted the road, and left it to the undisturbed possession of horses. We have heard much of a steam-carriage invented by Sir James Anderson, which is to surpass all others previously made, but it has not yet been practically tried.

The difficulties to be contended against evidently lie deeper than appears at first sight, but we are unwilling to believe they are insurmountable. The principal obstacles to success may be thus enumerated:—

First; the weight of the moving power, which has to propel itself, must always constitute a drawback to locomotive engines on common roads; and unless the advantages of employing steam are greater than this drawback amounts to, there is here a stumbling-block at the very threshold, which cannot be got over.

Secondly; the derangement of the machinery from the jarring to which it must be exposed by the unevenness of the road.

Thirdly; the loss of power in ascending hills, and from the unevenness of surface, on the road.

Fourthly; the danger arising from the accidents of the road; not only to the locomotive and the passengers, but to all other travellers, in consequence of the fright produced in animals by the noise of the engine.

These objections, though formidable, are not irremediable. The first one, however, deserves more consideration than has been hitherto bestowed on it; and we are of opinion that none of the kind of engines we have mentioned is capable of being profitably used for conveyance on common roads. The weight of the engine and boiler generally exceeds two tons, in addition to the carriage; and this dead weight has to be dragged along without any relief. Some mode should, therefore, be adopted of overcoming this defect, and also that of the derangement of the machinery, by the contrivance of some other application of steam power, which will be less heavy and more simple. This, no doubt, is to be accomplished. We have, indeed, had under consideration a plan for accomplishing this object, which, if successful, would overcome three of the obstacles we have enumerated. But whether that particular application of steam be successful or not, it is certainly within the range of probability to construct an engine that will meet all the conditions proposed; viz., lightness, simplicity, and absence of noise.

The difficulty arising from the inequalities and unevenness of surface is necessarily inseparable from travelling on common roads. It is a difficulty, however, to which the application of animal power on roads is equally subjected, and in our present view we are considering the case merely in reference to the competition of steam with horse power. Animal power has, however, this advantage over steam, as commonly applied, that it may be exerted more or less powerfully in proportion to the obstacles to be surmounted. But this advantage may also be given to steam, if the engines were properly constructed for that purpose. We believe that the only mode adopted of increasing the power in the locomotive engines hitherto tried on common roads, has been to increase the pressure of the steam in the boiler. This is an extremely irregular as well as dangerous plan, and can only be carried into effect to a very limited extent. Were the plan adopted which we have previously proposed for locomotives on railways, of working the steam expansively, the difficulty could be obviated with much greater certainty, and without any danger. Were the cylinders enlarged to double, or even to quadruple the area of those hitherto employed, and the steam cut off at half or quarter stroke when the roads are good and level, and the quantity of steam admitted were increased with the extent of the obstacles to be surmounted, there would, by this means, be obtained an effective reserve of power to be put forth as occasion required;—the steam would be economised, and all danger from adding to its expansive force would be avoided. In our opinion the failure of the attempts to employ locomotives on common roads is partly to be attributed to the want of means to adapt the amount of power employed to the circumstances of the case, which is especially required in travelling on common roads.

The noise of all the locomotive road engines hitherto constructed, when working at full speed, would be a complete bar to their general introduction, unless some means were found of deadening the sound. Those only who have ridden in steam coaches, propelled with great velocity on common roads, can be aware of the extent of the danger. The horses and all other animals on the road take fright. Some attempt vainly to run away from the terrific panting, roaring, thundering, monster; others, panic-struck, stand in its direct course unable to move away, or run about deprived of all power to get out of danger. Unless, therefore,

the noise can be avoided, the idea of obtaining rapid motion on common roads by steam power must be abandoned. It would then become a question, supposing all other difficulties to be surmounted, whether separate steam-carriage roads or tramways might not be advantageously constructed. Were roads of this kind formed, they would constitute a species of railway with undulating surfaces; the chief differences between them being, that the engines on the tramways would not be confined to a certain track of rails; and they would have to ascend hills. The latter point would constitute the most important feature of difference, and it is in this respect that the great advantage must always remain with railways. The weight of the engine when once in motion on a level smooth rail, is not a very material consideration. It forms about a fifth part of the whole load; and as the road is assumed to be level, the only obstruction to its motion is the friction of the axles and the slight inequalities of the rails and wheels. On hilly ground, on the contrary, the dead weight of the engine requires to be lifted up every elevation; and, admitting that steam-engines may be constructed so as to adapt their powers to these unequal demands upon them, still the power which would thus be required to lift the whole weight of the engine and the train must be obtained by an additional consumption of steam. The necessary amount of force to draw a train of carriages up a hill at a moderate velocity, would far surpass that of any locomotive engine which we contemplate. This advantage of *a level road* must always remain to railways, however great may be the improvements introduced in steam-carriages; and though the latter may probably be made to supersede in a great degree the use of horses, they can never rival in speed, safety, or cheapness, the conveyance by locomotives on railways.

ABANDONMENT OF MANUFACTURES IN EGYPT.

The report of Dr. Bowring, on the commerce and manufactures of Egypt, has been strongly criticised by a correspondent of the *Times*, at Alexandria, who affirms that the doctor was entirely misled by the Pacha's agents, in the favorable accounts he has given of the state of affairs under Mehemet Ali's rule. The following description is given as the real position of the Pacha's manufacturing establishments:—

The report contains voluminous returns of the Pacha's cotton factories and their products: not one of these is in existence at present. The walls and worn-out machinery, indeed, encumber the ground, but nothing more is thought of in the way of cotton spinning or cotton printing. They have been worked to a stand-still, morally, materially, and commercially! How could it be otherwise? The Pacha knew nothing of cotton-spinning, but everybody around him was willing to humor his whim, and profit by his ignorance. He paid like a prince for old lead, and worthless French machinery, which was perpetually going out of repair, and which there were no arrangements for mending. Poor fellah peasantry in the lowest state of ignorance were seized on *en masse* to work them, and imprisoned in the factories till two kind-hearted kinsmen or friends came forward to go bail for each, that they would not run away. Those who had no friends suffered perpetual imprisonment there, and the whip was employed as the primum mobile. They were allowed nominal wages of about 3¾d. per day, but their accounts were only settled about every 12 or 15 months. Meantime they were advanced one-third in the shape of bread as an allowance for subsistence on account at the rate of about 1¼d. per day. The poor wretches were only given coarse bread from the Pacha's baker, who was allowed the monopoly of supply for the nominal profit of the Pacha, and who charged them "Pacha's price." They wanted many other articles, "for man cannot live by bread alone;" so they were obliged to keep some of their bread, and sell it to their families and external friends for milk, meat, or vegetables. They were also kept on the brink of starvation, for they were thoroughly dependent on the baker for subsistence; and when he was out of fuel or flour, or, peradventure, was on a journey, they were left to suffer the pains of hunger as they plied their looms. I am assured that in one of the best regulated factories under English superintendence, it has been no uncommon thing to find them left without food from breakfast time on Monday till supper time on Tuesday! When the managers found the shuttles or mules moving faintly, and inquired the cause, they would perhaps find the poor patient wretches starving! But they could not mend matters; complaints were useless. They were working on the Pacha's system, and, if they wished to keep their men alive, they must put their hands into their own purses and send to their own baker for a basket full to distribute in charity among them. Of course Dr. Bowring was not permitted to see such sights. Neither did he see how the poor workmen were provided for perforce, when they were getting naked, by the distribution of pieces of calico among them at "Pacha's price;" nor how they were supplied with beef at prime cost, when a mill-ox caught the plague or the staggers, and after years of labor became insensible to the lash! The Nazir must square his accounts, at all events; and the most approved plan was to cut the deceased bullock's throat, cut him up into fragments, and charge these to the workmen's accounts at a rate that would repay the Pacha for what the animal cost years ago. This is a point in the Egyptian factory system to which English civilisation has not yet attained. The happy result is, that the cattle may be neglected, overdriven, or starved in the work, and still the Nazir's balance-sheet shall exhibit no defalcation! Doubtless your manufacturing readers will stare at the mention of cotton-spinning machinery impelled by oxen. *Mais que voulez vous?* The Pacha would have manufactures; but he has no fuel in Egypt for steam-engines, and no fall for water-wheels, except in the very bed of the Nile; so he was obliged to content himself with oxen, although the act of changing or stopping for an instant altered the cards and spoiled the work. The Pacha, too late, found that he was riding a very expensive hobbyhorse, and so economy became the watchword in the factories. No time was allowed to clean the machinery; even wiping it was declared a dead loss, for so much oil was carried away thereby (independent of what was stolen and eaten by the half-famished workmen), and at last it became a point of emulation to work the driest and most squeaking machinery. The managers, who complained of this to "the Council of Public Instruction," got the character of wasteful fellows. If they found a good workman or an industrious hand in their factories, and recommended that his wages should be increased, to make a distinction between him and the idle and incompetent, they were censured as innovating spendthrifts. Then, to mend the matter, when recruits were wanted the pressgangs were sent to the cotton-mills, and often took away those who had learned something of the management of the machinery. Various practical reforms were suggested by the English managers and engineers, which all stuck fast in the "Council of Public Instruction," or in one of its subordinate divans, composed of men who knew no more of manufactures or machinery than so many donkeys. The result was that everything got gradually worse and worse, until at last the Pacha's 44 manufactories died a natural death. Despite all the expense bestowed on the manufacture, he never could produce one article fit for the market; and I know, as a fact, that his cotton-twist sent to Bombay, and thence to Calcutta, was returned to Cairo as unsaleable. "They wouldn't have it at no price." We need not wonder at this. The cotton had been wrought from the first amid dust and dirt, damp or sunshine, just as it happened, and the waste was worked up with it by order of the Council of Public Instruction and its *filiere* of divans, on economical grounds. Not the slightest attention was paid to temperature in the manufactories, and the working population were left in such a destitute condition, that the superintendents were occasionally obliged to keep a pig's foot lying in the oil for the machinery, to prevent it being used for food by them. The manufacture of silk stuffs has been similarly abandoned, and the factory of Houd-el-Marsoud, in Cairo, is the only place where muskets and small arms are now fabricated.

BRITISH PATENTS.

ENGLISH EXPIRED PATENTS.

JAMES FRASER, of Hounsditch, London, engineer, for *an improved method of constructing capstans and windlasses*, Jan. 11, 1841.

JAMES FRASER, of Hounsditch, London, engineer, for *an improved method of constructing boilers for steam-engines*, Jan. 11.

WILLIAM WILMOT HALL, of Baltimore, America, at present residing in Westminster, attorney at law, for *an engine for moving and propelling ships, boats, carriages, mills, and machinery of every kind* (being a communication), Jan. 15.

WILLIAM HOBSON, of Mark Field, Stamford Hill, gent., for *an improved method of paving streets, roads, lanes, and carriage ways in general*, Jan. 15.

JAMES NEVILLE, of New-walk, Shad Thames, Surrey, engineer, for *an improved carriage to be worked or propelled by steam*, Jan. 15.

WILLIAM MASON, of Castle-street East, Oxford Market, Westminster, patent axle manufacturer, for *improvements in the construction of those axle-trees and boxes for carriages which are usually termed moil axle-trees and boxes*, Jan. 15.

ROBERT COPLAND, of Wilmington-square, Middlesex, for *improvements for combinations of apparatus for gaining power*, Jan. 16.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLLMENT OFFICE.

(Continued from page 21.)

RICHARD BEARD, of Egremont-place, New Road, gent., for *improvements in apparatus for taking and obtaining likenesses, and representations of nature, and of drawings and other objects* (being a communication), Dec. 13.—Claim first.—The mode of obtaining likenesses and representations of nature, drawings, &c., by the use of concave mirrors, as described.

A rectangular box is provided, at one end of which a concave mirror is placed, at the other end is an opening of the same diameter as the mirror, and in the top of the box there is also an opening. A light frame is held by an adjustable stand, which is adapted to the box, so that it may easily be shifted nearer to, or further from, the mirror, as occasion may require. The mirror may be either of glass or metal, and the size preferred is seven inches diameter with a focus of 12 inches. The object from which a likeness is to be obtained is placed in a suitable position, and kept perfectly still, when the image will be reflected in the concave mirror, and thence on the prepared surface which is held in the light frame. In some instances a second and

large mirror is employed, to concentrate the rays of light on the object; in other cases, if the light be too strong, a roof of blue glass is interposed between the object to be copied and the light, which has the effect of softening the same, &c.

Claim second.—The method of preparing surfaces for obtaining likenesses, &c., by the use of smooth hardened rollers, as hereafter described.

Claim third.—The mode of preparing the same surfaces by the use of iodine with nitric acid and water, or iodine with bromine, or by preference with bromic acid and water, as a means of quickening the process.

Two sheets of copper, having each a proper silvered surface, are first properly cleaned with dry cotton, or if necessary, with dilute sulphuric acid. They are then placed with their silver surfaces together, and in that state passed between a pair of smooth hardened rollers. This is repeated five or six times. They are then to be annealed by being heated to a low red heat, and suffered to cool, when the acid process is again repeated. The smooth rollers are then slightly closed (as the plates will have become thinner), and the plates again passed through them as before; when the silver surfaces will have become quite smooth and even. They are then rubbed with a tuft or bunch of cotton dipped in dilute nitric acid and tripoli; which is afterwards cleaned off with dry cotton, the plates being rubbed, in both cases, in a circular direction. A velvet rubber on which a portion of impalpable powdered charcoal has been sprinkled, is applied to the plate in a direction transversely to its length. The plates are then ready for the next process: for this a rectangular wooden box is provided, in which is a square glass vessel, with a sliding plate-glass cover of more than twice its length. The wooden box is provided with a cover, which has an opening at each end sufficient to allow of the sliding of the cover of the glass vessel through the same. Iodine with nitric acid and water, in equal proportions, or iodine with bromine, or bromic acid and water in equal proportions, are next introduced into the glass vessel, to produce the necessary vapors. The metal plate is then slid over the top (the aperture not being large enough to permit it to fall through) with its silver surface downwards, which thus becomes acted on by the vapors, and finished; and on being removed the glass vessel still remains covered by the other end of the long glass cover, and thereby the loss of vapor is prevented. The plates thus prepared are placed in any proper dark receptacle for preserving the same until they are required for use as before described.

JOSEPH WOLVERSON, of Willenhall, Stafford, locksmith, aud WILLIAM RAWLETT, of the same place latch-maker, *certain improvements in locks, latches, and other fastenings for doors*, Dec. 13, 1840.—Claim first—The improved bolt under any modification.

Claim second—The bolt, plate, and swivel link.

The bolt, instead of being held in its place by a square flat staple, has a hinge joint, which vibrates to and fro with the reciprocating action of the spring bolt. The follower, instead of being formed by two straight lever arms, is constructed with arms of a curved form near the ends, by which means the friction is equal. The above improvements may be applied to rim locks in connexion with a new bolt of a magnet form. The second claim relates to a new bolt, over which the plate of the block is turned with a swivel link, so that the lock may be applied to any kind of doors, trunks, or drawers.

CHARLES MAY, of Ipswich, engineer, *improvements in machinery for cutting and preparing straw, hay, and other vegetable matters*, Jan. 6th.—Claim first—The mode of constructing chaff-engines worked by two feed rollers, and driven by a worm, by applying a change motion thereto.

The fly wheel is not keyed on the worm shaft, as is usual, but on a separate shaft, on which are as many toothed wheels as the number of changes of motion require. These wheels gear with others on the worm shaft, in such a manner that whenever two are in gear all the others are out of gear. The change of speed is effected by a sliding motion, when the working wheels will be thrown out, and others (they being of different sizes) brought into gear.

Claim second.—Mode of laying straw, hay, and other vegetable materials, longitudinally and even, by drawing out and combing.

Four pairs of rollers are used, each pair increasing in speed as they approach the cutting part. Seven of these rollers have spikes on their surfaces; the eighth is a smooth roller, which is connected by an endless fabric with another roller. The straw, hay, &c., are placed promiscuously on the endless fabric, and drawn forward by the revolutions of the rollers, being combed straight and evenly by the spikes on the surface of the rollers, between which it passes, until it is delivered out between guide plates, in a nicely-arranged form, ready for the cutters.

Claim third.—Mode of applying the presser plate to chaff-engines by a movement independent of the upper feed roller.

The presser plate, instead of being immoveably fixed to the bar or bridge of the frame, is fitted to the neck or axis of the upper feed roller, and is kept down by a pair of springs, pressing against each other, so as to give more uniformity to the layer or wad near the cutters.

Claim fourth.—Mode of applying spiral cutters to chaff-engines, and also the method of grinding or sharpening the same.

This claim refers to an improvement on the chaff engine known as the Doncaster engine, and consists in the bevil of the spiral cutter being upwards and outwards, which admits of the same being sharpened by the application of a metal plate with a steel surface, with the addition of emery or any other material suitable for grinding and sharpening.

Claim fifth.—Mode of preparing the gorse by a machine, by means of a circular trough and stampers.

A vertical rotary shaft has a circular trough fixed to the lower part, the whole being supported by any proper frame-work. Near the upper end of the shaft is a horizontal plate. Stampers are so adjusted with inclined planes on their upper parts that the revolution of the shaft with the horizontal plate causes a free up and down motion of the stampers; to each of the stamper rods there is a cord attached, which also communicates with a spring fixed to the rotary shaft, so that a rotary motion is given to each stamper, which has the effect of grinding and pounding any gorse or other vegetable substance contained in the circular trough as it revolves.

ENTERED AT THE ROLLS CHAPEL OFFICE.

(*Continued from page 5.*)

BENJAMIN WINKLES, of Northampton-street, Islington, *certain improvements in the construction of paddle-wheels and water-wheels*, Dec. 11, 1840. The first part of these improvements relates to propelling wheels for navigation, and consists in constructing them so that the paddles present their broad surfaces to the mass of water, and as the wheel revolves they fall down, and pass out of the water edgeways. The paddles form a curve, corresponding with that of the outer rim of the wheel, and are severally mounted on axles, which enable them to turn over freely. Their outer edges may bear on the outer edges of the wheel, against which they may be thrown by the centrifugal force, or fall of their own gravity. A curved eccentric, or snail-formed bar, is fixed to the interior of the paddle-box or side of the vessel, and a tail lever extends from the back of each paddle, carrying an anti-friction roller or boss, which, as the wheel turns round and comes in contact with the curved bar, causes the paddle to be thrown into a proper position ready to perform the stroke; aud it is firmly fixed in that position by its inner edge being brought against and being taken hold of by a spring catch or latch, fixed to the inner edge of the framing. When the wheel has passed the lower part of its rotary course, a stud in the side of the spring catch comes in contact with an inclined bar, and the paddle is released, and falls so as to pass through the water edgeways. The next part relates to water-wheels, known as breast-wheels. The buckets are constructed by means of falling plates, which assume the form of buckets when in a horizontal position on the breast side as the wheel revolves, and afterwards collapse as they proceed to the lower part of the rotation, and then pass through and escape from the stream edgeways.

WILLIAM LANCE, of George-yard, Lombard-street, insurance broker, *a new and improved instrument, to be used in whale fishery, part or parts of which, upon an increased scale, are also applicable as a motive power for driving machinery*, Dec. 11.—Claim first.—The application of the whole, or any part, set forth to be used in whale fishery.

Claim second.—The use of compressed air as a means of projecting any missile, for the purpose of taking or destroying whales.

Claim third.—The effecting an explosion in the body of the whale, distinct from that by the use of rockets.

Claim fourth.—The employment of air highly compressed as a motive power.

Claim fifth.—The use of fans, or screws, for driving machinery.

A spindle has a quick-motion screw-thread cut upon its entire length, and works into a female screw, in the head of the harpoon. At the other end of the spindle is a fly, connected by a universal joint. The action of the water against the arms of the fly, as the whale proceeds, forces the point forward into the whale's body. To this instrument is attached a closed metallic vessel, the natural buoyancy of which will greatly impede the progress of the whale. The next form of instrument is a harpoon, with a head of a conical shape, with triangular cutting edges towards the point, and furnished near its base with barbs, or flocks, turning on pivots, which will expand the moment the strain comos upon the line, and prevent its being drawn out. The next form of instrument has arms, or levers, in the place of tho barbs, the outer ends of which are made to diverge upon meeting with resistence from the body of the whale as the instrument enters. This motion will cause jaws, on their reverse end, to collapse aud break a small tube, placed between them in an aperture communicating with a charge of gunpowder, or other explosive mixture. The tube contains a small portion of concentrated sulphuric acid, and is surrounded by a composition of chloride of potassa and sugar. The action of the acid upon the composition fires the charge, which will then explode in the body of the whale. These instruments are to be projected by means of highly compressed air. The gun, or tube, has a reservoir of air underneath the breach, and is mounted on a standard, having a universal motion, and may be fitted in any part of the boat. The charge is effected by rapidly turning a handle, which opens a valve, and admits the air into the gun, or tube.

A new break is also shown, to be used in the place of the ordinary "sogger-head." It consists of a barrel suitably mounted on bearings, round a flange, on which there is a band of metal having attached to it a lever so loaded that the resistance of the ring of the line is almost sufficient to carry down the boat; but yields and allows the line to run as soon as the strain upon it is greater than would be safe, and is thereby self-acting: part of these improvements may be applied to machinery as a motive power. The air may be condensed into a vessel of sufficient strength, and supplied to the cylinder for working the piston; it may be supplied direct to the cylinder from the reservoir, or may first pass through a coil of tube, which being acted on by heat would increase its elasticity. Motion may also be gained by the application of a set of fans partly immersed in a stream of water, the action of which on their face, at an angle to the plane of their motion, would cause them to revolve, and thus communicate motion through gearing to machinery.

Ezra Jenks Coates, of Bread-street, Cheapside, *certain improvements in propelling canal and other boats* (being a communication), Dec. 13.—Claim. Propelling vessels on rivers and canals, by means of an endless chain or band passed over pulleys, situate at the stem and stern of a tug-boat or vessel, and having part of its length lying along the bottom of the river or canal, for the purpose of obtaining a hold thereon, or means of resistance therefrom, as hereafter described; whether such endless chain acts in conjunction with anchors, or not. A steam drag or tug is constructed so as to draw a number of boats or vessels after it, which may be connected by means of cables or otherwise. The endless chain is furnished with anchors or catches. The driving wheel is fixed at the front part of the boat, and has spikes or projections on its periphery, which take into the openings or links of the endless chain; the other wheel is situate at the stern of the tug, and derives its motion from the friction of the chain passing over its periphery. The endless chain passes over and is supported by several anti-friction rollers to facilitate its progress. The spur or driving wheel being caused to revolve by the application of the power of a steam-engine, or other convenient means. Anchors, catches, or holders, may be attached to the endless chain; these may in some cases be dispensed with if the chain be lengthened, when the weight thereof will cause a sufficient resistance by being allowed to drag along the bottom of the river or canal.

Edwin Turner, of Leeds, engineer, *certain improvements applicable to locomotives and other steam-engines*, Jan. 6, 1841.—Claim. Method of supplying the hot water for feeding the boiler of a steam-engine, either locomotive or stationary, by the means hereafter described, of passing the water through tubes, constituting the fire-bars of the furnace.

Two longitudinal tubes conduct the cold water from the tender, through which tubes the water is drawn by means of pumps, and forced through the contorted tubes and their several valves and cocks into a transverse tube, which forms one end of the fire grating, and is a main to which all the fire-bars are connected, their other ends opening into another transverse tube. The water thus injected by the contorted tubes is made to flow through all the tubes forming the fire-bars, and in its passage to become heated to nearly boiling point, and in that state conveyed to the boiler, by which means great economy of fuel is obtained.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page 21.*)

James Harvey, of Basing-place, Waterloo-road, timber merchant, for *certain improvements in paving streets, roads, and ways with blocks of wood, and in the machinery or apparatus for cutting or forming such blocks*, Dec. 2.—Claim first.—The shapes or configurations of all the blocks, shown in the drawings annexed to this specification.

Claim second.—The application of a stationary knife, or cutter of any shape, in connection with the machinery described for the purpose of cutting blocks of wood for paving roads, &c., in whatever manner such stationary cutter may be applied.

There are forty views shown of the different blocks alluded to in the first claim, and as they cannot be clearly described without the assistance of drawings, we will proceed at once to the working part of these improvements.

The frame-work of the machine is of cast-iron, to give the necessary strength. A cranked axle revolves in plummer blocks supported by standards; in the centre of the machine, two pairs of connecting rods are jointed to two cross heads, these work horizontally in guides, one on each side of the shaft. At each end of the machine a knife or cutter is fixed, in front of each of which there is a table. On a block being placed on a table, and motion given to the main shaft, the cross head strikes the block, and forces it against the edge of the cutter, thereby cutting it partly through. Another block is then placed on the table. This on being struck in the same manner by the cross head, on the next revolution of the shaft, will strike against the first block, and thereby force it through the cutter, when it is finished. The last block being acted on in the same manner by the succeeding one, &c., the same operation is going on at the other end of the machine. The inventor does not confine himself to the shape or construction of the stationary cutter (as that must necessarily depend on the required form of the block), nor to the method of working the apparatus horizontally.

Samuel Sailsbury Eagles, of Liverpool, engineer, for *certain improvements in obtaining motive power*, Dec. 2.—These improvements are chiefly applicable for the purpose of propelling vessels. Two horizontal steam cylinders, each having one end open, are placed parallel to each other in the stern of the vessel below the water line, the open ends being towards the stern. In a line with these are two other cylinders open at both ends, and also placed horizontally, with one end of each passing through the stern of the vessel to the water. On the outer end of each piston-rod of the steam cylinders is a piston fitting the open cylinders and entering the same as the pistons move out of the steam cylinders. On the inner edge of each piston rod a rack is formed; these take into a horizontal toothed wheel placed between the two, and which revolves loosely on a vertical shaft, so that on one piston being forced outwards by the steam, the body of water that has flowed into the open cylinder is displaced; the forward movement of the one piston assisting the retrograde motion of the other, by means of the toothed wheel and rack. The steam-cylinders are so arranged that the opening of the eduction valve of one cylinder causes the opening of the inductive valve of the other, which causes the pistons to work alternately; the resistance of the water in the open cylinders against their respective pistons, causing the vessel to move in a contrary direction. The apparatus is worked by an atmospheric engine, which works horizontally, and by which means, with the apparatus above described, the inventor observes that a saving of $53\frac{1}{3}$ per cent. is obtained; viz., $33\frac{1}{3}$ by dispensing with the paddle-wheels, and 20 per cent by the non-employment of cranks.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 20th of March.

William Freeman, of Millbank Street, due March 7.

Thomas Motley, of Bath Villa, Totterdown, Bristol, due March 7.

William Coltman, of Leicester, and Joseph Wade, of Leicester, due March 7.

John Whitehouse, of Birmingham, due March 7.

Samuel Parker, of Piccadilly, due March 10.

Mark Freeman, of Sutton Common, due March 10.

Paul Hannuic, of Clement's Lane, due March 10

Charles Delbruck, of Oxford-street, due March 10.

Edward John Dent, of Strand, due March 10.

Henry Houldsworth of Manchester, due March 10.

Hugh Lee Pattinson, of Bensham Grove, Durham, due March 10.

George Alexander Gilbert, of Southampton Buildings, due March 10.

Robert Goodacre, of Ullesthorp, Leicester, due March 10.

James Pillbrow, of Tottenham, due March 10.

FOREIGN INTELLIGENCE.

FRANCE.

The *Journal de Toulouse* of the 1st January says, "General Paixhans, inventor of the new plan of making cannons, to which his name has been given, and of which the English made such terrible use at the last siege of St. Jean d'Acre, has been appointed commander of the artillery school at Toulouse."

BELGIUM.

GENERAL REGULATIONS OF THE BELGIAN RAILROADS.

At the present time, when a conference of the railway companies in England is about to be held, for the formation of general regulations to be observed in the management and working of their respective lines, it seems desirable that the regulations adopted on the Belgian railroads should be generally made known. Since these regulations have been enforced there have been fewer accidents on the Belgian chain of railways than on any other, and collisions of trains, which have of late so frequently happened in England, are almost unheard of. We extract from the rules those only which are generally applicable:—

POLICE REGULATIONS.

1st. With the exception of the servants and workmen employed on the railway, no person shall at any time pass along the line, without special permission, obtained from the Minister of Public Works, or the director. All passing of horses or carriages, other than those employed on the works, is forbidden. This prohibition is indicated by posts fixed at the places where the railway crosses the public road.

2d. The porters, servants, and clerks are expressly prohibited from introducing, or permitting to pass, into the interior of the stations, any person who does not belong to the railway service: unless he has an authority, signed by the Minister of Public Works, or by the director. On days of extraordinary traffic, all orders of the kind will be, for the time, suspended; of which suspension notice will be given by a placard.

3d. The officers and policemen will prevent all drunken persons from entering the offices to take tickets; and will, if necessary, give them into the custody of the corps-de-garde.

4th. The railway officers and men will especially superintend the unloading and delivery of the baggage, as well as of the loading of it on the public conveyances.

5th. In case of a quarrel or fight between the conductors or coachmen of the omnibuses, or other public carriages, on account of the loading of the luggage, the policeman shall call in the assistance of the sentinel, and, if necessary, give the delinquents into custody. They shall be then conducted before the Procureur du Roi, to whom a declaration of the facts shall be made.

6th. There are single and double trains. The single trains are drawn by one locomotive; the double trains by two. Twenty-eight loaded coaches are considered the maximum load of two locomotives, working together. If the number of coaches amount from fourteen to eighteen, one locomotive only shall be used; unless it appear to the engineers that the journey cannot be performed in the given time with one engine. Generally, from Mechlin to Ans, the single trains shall not consist of more than twelve loaded carriages; the double trains of twenty-four.

7th. No carriage shall be loaded with more than three tons, or thirty passengers, including their small packages. Twenty-five soldiers, armed and equipped, shall reckon as thirty passengers. Five empty carriages shall reckon as three loaded ones.

8th. If the state of the road, or of the weather, renders it necessary, the maximum, both for single and double trains, shall be reduced, according to instructions of the mechanical engineers, who must take care to give notice of it in sufficient time, that the number of tickets given out may be limited accordingly.

9th. The receivers direct the formation and the departure of the trains, and superintend the conduct of the guards. They give the signal of departure to the trains. The police, both those at the station as well as those on the road, are specially under their charge.

10th. The hours for the departure of the trains being fixed by Government, can only be altered or delayed in consequence of an accident on the road, or to the preceding train. No train can leave a station till after the signal has been given by the chief guard.

11th. At the last stroke of the starting bell, the break of the tender shall be raised, and the machine shall commence its progress gradually.

12th. The trains are accompanied by a chief guard, by a guard of the first class, and by guards of the second and third class.

13th. Each engineer and each stoker, when the latter is not otherwise occupied in attending to his business, shall remain standing, the engineer on the platform of the locomotive, and the stoker on the tender close to the handle of the break, and shall keep vigilant watch along the road, and listen to the least signal of the train guard's trumpet. The engineer shall not leave his engine on any pretext whatever.

14th. When approaching the moveable switches on lines that are level with the high roads, and on curves, and particularly in going down hill, the engineer shall take care to see that the stoker is in readiness to put on the break.

15th. Every train, ordinary or special, travelling either during the usual hours, or during irregular hours, whether by day or by night, shall relax its speed on approaching *des ponts mobiles*, in order that the chief guard may descend, and that at the appointed signal the engine may be stopped before it arrives at the entrance of the bridge. After sun-set, the chief guard shall descend from the carriage to ascertain, before the train passes, if the bridge is closed and settled.

16th. The speed of the train shall be abated in the same manner at the entrance of the tunnel of *Camptich.* The trains shall not resume their speed on entering the tunnel until the chief guard of the train shall have ascertained from the tunnel guard that the passage of the tunnel is clear, and in good condition.

17th. In case the road should be rendered obscure by a cloud of steam, either in consequence of the rupture of a tube, or from some other cause, none of the succeeding carriages shall pass through the smoke; but the engineer shall stop and ascertain that the road is clear before he attempts to proceed.

18th. In general every engin er when the weather is foggy shall diminish his peed on approaching stations, so that he may be certain to stop the engine, and not incur the ris of running against a train that may be stopping there.

19th. A lantern of red glass shall be attached at night behind the last carriage of each train, when the train is to be followed by another. They who have charge of the management of the breaks, and also the guards of the trains, are responsible for this. If a wagon is attached to the train during its journey, or unfastened from the train during any part of the way, the breaksman shall also be responsible that the requisite change is made, in order that the lantern may always be placed behind the last carriage of the train.

20th. At each relay station (the stations of relay are those where the trains stop and take in water and coke), a reserve engine shall remain constantly in readiness, from the time of the first departure in the morning till the last arrival at night. The steam of this engine shall be kept up at the pressure of 35 pounds.

21st. When a train is half an hour later than usual, the conductor shall send the reserve engine forward, and for greater security shall accompany it himself, and discover the cause of delay. He shall also accompany the reserve engine in the same manner with the delegate of control whenever a signal of distress reaches the station. In this case, as soon as the signal is perceived, the conductor warns the receiver, and while the relief engine and the wagon containing the apparatus required is preparing, he orders another reserve engine to be got ready in case another should be wanted.

22d. In case of a train meeting with accident, the cantourriers (policemen), or the foreman of the work, shall immediately render assistance when required by the engineer or chief guard of the train. During the day the cantourriers shall hoist flags, and shall make signals in the direction pointed out to them by the chief guard, in order to demand the assistance, either of the reserve engine alone, or the engine and carriages, and instantly the same signal shall be repeated from post to post till it reaches the station from whence assistance is expected.

During the day the red flag commands attention and the slackening of speed; the red and white flags together signify that an assistant engine is wanted. The red flag hoisted behind a train announces that another train is following.

During the night the red lantern is the signal, and signifies the necessity of care and the slackening of speed.

The red lantern moved about signifies that an engine of assistance is wanted. The red lantern placed behind a train announces that another train is following. During the night, or even in open day, in case of any doubt arising respecting the transmission of signals, the cantourriers shall immediately communicate as quickly as possible from post to post, the orders and advice that they have received from the engineer or from the chief guard of the nearest or most central station according to circumstances.

(*To be Continued.*)

REGULATIONS BETWEEN MASTERS AND WORKMEN.

The Minister of the Public Works has sent a circular to the governors of the provinces of Hainault, Liége, Namur, and Luxemburgh, relative to the police regulations of mines, quarries, and manufactories of metal.

After adverting to the numerous proofs of solicitude exhibited by the Legislature and the Government for the inhabitants of the mining districts, the minister, in the following warm terms, advocates the adoption of saving-banks:—

"Saving-banks will have a desirable influence on the conduct of the miners. They will attach the workman to the establishment near which he works, and which is the depository of the sums that he has saved. He will not rashly renounce the fruit of his labors. A stronger tie will subsist between the master and workman—the former will appreciate the value of the patronage he exercises, while the latter will gratefully submit to a protection to the good effects of which he cannot be insensible. Not only will the saving-bank, which is supplied by the master and by the workmen, independently of the subsidies from Government, provide for the physical wants of the workman or his family, it will likewise have an influence on his moral conduct.

"No more useful appropriation of the overplus funds of these banks can be made than the establishment of guardian schools, preparatory schools for the workmen's children, or an establishment for adult classes. Thus the condition of the original founders of these institutions would be indirectly improved, but, what is of the greatest importance, they would afford instruction to a great number of children, who, without the help of the bank, would have no means of obtaining it. The Commercial Society of Brussels has just set an example which deserves to be followed, by making an annual grant to the saving-bank of the department of Mons, of at least five thousand francs, which gift is especially intended to encourage the instruction of the workmen's children."

The government and the proprietors of mines evince proofs of their solicitude for the working classes,—the latter ought to show themselves deserving of this general interest. The minister desires that at every opportunity the competent authorities should make the miners aware of the real advantages which result to themselves and their families in consequence of these decrees of the Government. At the same time, he explains the meaning of the different regulations from the 30th of last December, which define the legal duties of mining proprietors and their workmen.

The Minister of Public Works insists particularly on the advantages of *livrets*,* in reference to which he observes:—

"The *livret* places the workman immediately under the protection of Government; this is his title, his passport. The *livret* is the master's pledge for the execution of the contract that he has formed with his workman. Certain of seeing him finish his task, he shows more confidence, he even makes him pecuniary advances. Without the *livret* the workman is exposed to a number of temptations. Competition tends to render him unsettled. Influenced by bad passions he is drawn into unions; a moment's dissatisfaction is the cause of his leaving a master who requires his labor.

"The proprietor who is not assured that the workman will execute the conditions of his contract is more cautious and reserved; he endeavors to retain the workman in his service by pecuniary motives; he hesitates to advance him money, lest on the following day the workman, who is in general quite destitute, may have quitted his establishment.

"If the workman knew how to read and write he would have the conditions of the engagement with his master in writing. This is the case in England and in Scotland, where the workmen are not engaged till they have signed a paper regularly stamped. In working the mines of those countries the master has no power to dismiss a workman, nor can a workman leave his master, without many days' previous notice.

"The workmen in those countries are also obliged to take part in associations formed for mutual advantage; the master is the fund-holder. He frequently supports at his own expense a school for the education of the workmen's children. He provides them with a habitation in the vicinity of the mine. These mutual accommodations tend to the general advantage.

"But when the workman can neither read nor write the *livret* is the only guarantee that a master can obtain.

"The prosperity of a manufacturing establishment can only be maintained by means of good order and discipline.

"For the last ten years the police regulation of the *livrets* has in one district of the kingdom been neglected, in others it has been relaxed. The decree of the 30th December, 1840, has for its object to enforce the laws and regulations in these respects."

A notice from the Belgian Minister of Finance, dated the 5th instant, has reduced by ½ per cent. the interest on all Belgian Treasury Bonds, at all dates; so that the interest will in futuro be from 3 to 4 per cent. for bonds at six months, and 4½ per cent. at one year, instead of 3½, 4½, and 5 per cent., which were the rates hitherto used.

"The ratifications for the treaty of commerce between the Swiss Confederation and Holland were exchanged," says the *Balse Gazette*, "on the 23d ult."

The Belgian government has just communicated the following information to the Chamber of Commerce of the kingdom:—As a preliminary to the conclusion of a definitive convention between

* Small books kept by the workmen, in which their hours of work are entered, and the places where they have been employed, without showing which no master will engage a workman from another factory.

Belgium and Austria, the government of the latter has given the necessary orders that Belgian ships shall be treated in the ports of the empire, with respect to the navigation duties of every kind, on the same footing as the ships of the most favored nations, which is equivalent to a full and entire assimilation with the national flag.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

Proposed Railway from London to Staines.—On Tuesday a numerously attended meeting of the owners of property and occupiers of houses within the parish of Kensington, who will be affected by the projected new railway from Knightsbridge-green to Staines, was held at Old Brompton, to adopt measures to prevent its being earried into effect. Mr. S. Carter Hall was called to the chair. Mr. Martin, the solicitor for the opposition, then read from the book of reference attached to the plans the names of the parties whose property would be most materially affected by the railway, amongst which were Lord Kensington, Earl of Harrington, Earl of Listowell, Lady Hotham, Lady Langford, Sir Charles Cockerill, the Westminster and West of London Cemetery Company, and Messrs. Gunter, Hutchins, and Poupart, market gardeners, &c. It also appeared that the site of the new church and burial-ground at Brompton would be required for the purpose. The following resolutions were carried unanimously:—"That the meeting views with great alarm the proposal of an intended railway, to be ealled the Staines Railway, and which, in their opinion, will most injuriously affect the parish of Kensington, and destroy the interests of the neighbourhood. They therefore resolve to oppose the said railway by every means in their power.—That it is highly desirable that all necessary proceedings be taken for effectually opposing the said measure in and out of Parliament. A committee was then appointed to conduct the proceedings in opposition to the Bill, and to collect subscriptions to defray the expenses.

Great North of England Railway.—The board of directors having heard that *Sunday working* has been continued on a part of the line, notwithstanding the positive orders given to the contrary, the sub-engineers have been expressly informed that such Sunday working is not to be repeated.

Completion of Railway Contracts.—In the Court of Queen's Bench, on Tuesday, Lord Denman delivered judgment in the ease of Roach and others, assignees of Paxton and Horton, *v.* the Great Western Railway Company. It was an action of trover, brought under the following circumstances:—The bankrupts had entered into a contract with the company to do certain work in the Box tunnel, and by the contract it was declared, that if there should be a certain delay in the work after notice, the defendants might take possession of the works and carry them on, and that all payments made before that time should be considered as fully satisfying all demands of the bankrupts for work previously done. The delay took place, and the notice was given, and the defendants took possession of the works and materials. A commission of bankruptcy was issued against Paxton and Horton. It was urged that the defendants could have no right to retain the materials, which, by the bankruptcy, had become the property of the assignees. The court considered that the bankruptcy had intervened before the property had become vested in the defendants, and therefore there must be judgment for the plaintiffs.

Manchester and Birmingham Extension Railway.—We understand that the promoters of the line of railway from this town to Rugby, are preparing to obtain the consent of Parliament in the next session for its formation. The great object of the undertaking is to make the route to London from Manchester, Liverpool, Chester, &c., more direct than that by way of Birmingham. The line is supported by the Grand Junction Company, and opposed by the London and Birmingham Company; the promoters are sanguine of success, contending that it will be of immense public utility. On the other hand, we are informed that it will be strenuously opposed as altogether unnecessary. The course which it is intended the line shall take, is from the Grand Junction Railway at the south end of the town of Stafford, by the Great Bridge to Milford, thence through a tunnel under the hill, and by Bishton; it will leave Rugely to the right, and proceed by Mavesyn Ridware to the left of Lichfield, and thence by Tamworth, Atherstone, and Nuneaton, to Rugby.—*Staffordshire Advertiser.*

North Midland Railway.—Traffic returns for the week ending January 2d—Passengers, parcels, carriages, and horses, £1,905 9s.; Merchandise, £727 7s 4d.;—total, £2,632 16s. 4d. Not including North Midland proportion of Manchester and Leeds traffic.

The Brandling Junction Railway.—This important undertaking, connecting the towns of Newcastle, Sunderland, and South Shields, presents an immense increase of traffic by the last returns, as compared with those of the eorresponding period of last year. In the months of October, November, and December, 1839, the total amount received for passengers was £5,250; for goods £744. During the same months in 1840 the amounts received were, for passengers, £9,735; for goods £831.

Effects of the Snow and Frost on Railway Conveyance.—The *Manchester Chronicle* gives the following report of the times of arrival of the different trains in that town, in the eourse of last week, when snow and frost, which are considered the greatest obstacles on railways, had to be encountered:—

"The mail train from London, which ought to have reached Manchester at half-past six o'clock on Wednesday morning, did not arrive till nine, and the same train did not arrive on Tuesday morning till half past nine. These delays were not occasioned by any of the trains being actually snow-bound, but chiefly by the slipping of the engine and tender on the rails.

"Manchester and Liverpool.—There has been no material interruption on this line; some of the trains, as is usual in the winter season, being a little behind time.

"Manchester and Leeds.—The first train which left Manchester on Wednesday morning, on reaching Littleborough, was detained for some time, owing to a heavy drift of snow which had lodged on the line. The carriages were detached from the engine, which was run forward for some distance to clear the way, and then returned for the passengers. Between Todmorden and Leeds the impediments were still greater: the engine and tenders were again detached, and driven forward, in some instances more than two miles, and then returning for the passengers. A great number of workmen were employed in clearing off the snow, by whose assistance the line was ultimately cleared, and the subsequent trains enabled to proceed without much interruption or delay.

"The London mails which ought to have reached Manchester on Tuesday and Wednesday mornings were detained about three hours each morning, and subsequently they have all been more or less too late. The York mail, which left this town on Wednesday morning at nine o'clock, on arriving at Littleborough was so much impeded that it was necessary to yoke eight horses, which were continued to Halifax. On the same evening the Colne and Burnley mail, which should have reached Manchester at six o'clock, did not arrive till ten, having had to cut its way through eight or nine feet of snow between Burnley and Skipton. The north mails, which are due here by six o'clock in the evening, did not reach till seven o'clock on Tuesday and Wednesday mornings. Throughout the whole of the week the deliveries at the Post Office have been more or less too late."

Edinburgh, Dundee, and Northern Railway.—The survey for this railroad is in active progress, and will be completed in sufficient time for the parliamentary plans being lodged, in terms of the standing orders, by the 1st of March next. The engineers have received instructions to include low-water piers at the termini both on the Frith of Forth and on the Tay; and the parliamentary agents have been instructed to give the requisite notices for these piers.

Glasgow, Paisley, and Greenock Railway.—At the half-yearly meeting of this company, the report of the directors and of the engineers, explaining the canses of the non-completion of the line to Greenock, were read. The report of the directors was as follows:—

"Greenock, 2d January, 1841.

"In meeting the proprietors on the present oecasion, the directors have to express their regret that they cannot congratulate them on the whole line having been opened. Until recently they had reason to believe that no circumstances could have so long delayed this most desirable event. Their regret is further enhanced by the fact of the line having been for some time finished from Glasgow to Greenock, with the exception of a short distance at the tunnels, thus delaying the opening of the whole from the obstruction at one point, unless by a change of carriages, a proposal much discussed some months ago, but which, after many deliberations, it was not considered expedient to adopt.

"The quantity of work remaining to be done is very small; and, in ordinary material, the directors would have no hesitation in advertising a very early day for opening; but, with the experience of previous disappointments, they will not name a time which they eonceive ean by any contingency be exceeded.

"Although deeply anxious to put the proprietors in possession of an early return, the directors wish to impress on them that the lapse of a few days, at this dull season of the year, cannot be placed in comparison with bringing the line into the same perfectly finished state at the tunnels as it is at every other point, in order to provide for that entire safety in working it, during the spring months, which the public have a right to expect, and which it is the interest of the railway company to afford.

"It is a feeling at the board, deduced from recent observation, that the railway being laid is not sufficient to warrant its instant use; and they desire to present their line, at all its points, to the Government Commissioner, who will be ordered to report on it, in the most finished state."

The reports of Mr. Lock and Mr. Errington describe the difficulties they have had to encounter in working through the whinstone rock; which difficulties have been increased by the obstacles thrown in their way by the owners of the land, and their refusal to allow the requisite shafts to be sunk, to facilitate the operations. Mr. Errington, in his report of the state of the works, observes:—

"In the tunnels and adjacent rock-cuttings, the greatest number of cubic yards remaining to excavate in one mass is 6,200; and the whole, divided into four portions, is about 11,000 cubic yards. To deal with this work, there are nearly 1,000 men, (980 is this day's return), and three fixed engines, with four double horse runs. The same number of men at work upon any ordinary rock would clear out this quantity in a fortnight; but as we are driven closer together at the different faces, and the blasts are now very frequent, the result is uncertain; and I feel bound to state that it may be far in the month of February before the line is thoroughly finished for the traffic at this point.

"The length to complete in the west tunnel is sixteen yards, and in the east twenty-six yards, which is again a proof of the very uncertain nature of the material, for the west tunnel is twenty yards longer than the east, and was delayed by an interdict against sinking the shaft, yet it is now ten yards a-head."

The committee report, that since the opening of the railway to Paisley, on the 14th July last, to

the 30th November inclusive, a period of 4½ months, 265,343 passengers (including 50,211 carried to or from the Ayr Railway) have been conveyed along it without the slightest accident. The traffic in passengers has far exceeded previous calculation, and when arrangements are completed for the conveyance of goods, which they soon will be, the revenue will be increased. The company's share of the profits on the joint line for the four months and a half are stated at £2,009 17s. 2d. In order to complete the works, it is proposed to apply to Parliament for a bill to enable the company to raise by additional shares £90,000. The directors announced, that in consequence of application to the Government to stop the mails on Sundays, the railway will be in future closed on that day. Thus, it appears, that the long-contested point has been yielded by the Government, and that the strict Sabbath-keepers have gaiued the day, and have put a stop to all communication by railways, on that line at least, on one day of the week.

Ulster Railway.—The traffic on this railway (eight miles opened) was, for the week ending 10th January, 1840,—passengers, 5,244; receipts, £145 6s. 4d.

Mr. Bergin's Buffing Apparatus. — From numerous experiments, and after much deliberation, we are of opinion that the buffing apparatus is incompetent for the part it has to perform. It is upon a wrong mechanical principle, and that of Mr. Bergin ought to have a more extended trial. Their difference is shortly as follows:—By the present mode, the first carriage receives the worst shock of all when the train runs against any obstacle; the second receives a less shock, and so on, decreasing to the last; and when an engine runs into the rear of a train the order is reversed. Mr. Bergin's apparatus distributes the shock equally throughout, and it has the additional advantage of always having the buffers of one height, which is not the case in the present ones. Experience has largely shown that with the present buffers it is the foremost carriages which are in general smashed to pieces when the trains run against any thing, and the after ones when the train is struck behind. In each case the buffer springs, for want of strength, are pushed home, and then comes the crash; while it has happened in more than one case that passengers at the other extreme end of the train have hardly felt any thing, and in some instances have not known that a collision has taken place. The risk is therefore totally unequal, while with Mr. Bergin's plan all have the same chance. On many railways, second and third class coaches have nothing but a leather buffer stuffed, without rods and springs, and some merely a block of wood. This requires alteration. No carriage whatever should be allowed to go in a passenger train without these appendages, until, at any rate, railways are so improved in their management and mechanical arrangements, that there may be a rational hope of their running without collision, which is most certainly not the case at present.—*Railway Quarterly Journal.*

RAILWAY ACCIDENTS.

Collision on the Manchester and Leeds Railway.—A collision took place near the Cooperbridge station on the Manchester and Leeds Railway, last Wednesday evening. A cattle train of nearly twenty wagons, with sheep, &c., left Wakefield a little before four o'clock in the afternoon, and got on very well until they passed the Dewsbury station, when the engine began to show signs of *weariness.* Before they could reach the Cooperbridge station the water was exhausted; the engine was then detached and proceeded to the Brighouse station for a supply. In the interval, the next train, which leaves Wakefield at half-past four, came up, and, owing to the dense fog which prevailed, the engineer was unable to see the former train until he arrived within a short distance from it. The engine was immediately reversed, and the breaks applied to the wheels, which greatly decreased the force of the shock which took place. Two of the carriages were broken, and the engine partially thrown off the rails, but none of the passengers were injured beyond a severe shake from the concussion; the sheep also in the first train escaped without harm. An inquiry was set on foot the same evening by several of the engineers and directors, and after a most rigid investigation the servants of the company were fully acquitted of all blame.—*Halifax Guardian.*

Fatal Collision on the Midland Counties Railway.—A collision on this line occurred on Friday morning 8th inst. between two and three o'clock, owiug to the severity of the frost freezing the engine pipos of a luggage train, which consequently could not get off the line of rail before the following mail train came and ran against it, killing by the force of the shock the engine driver and stoker of the mail train. The following is the official account of the accident:—"The night merchandise train left Leicester with loaded wagons and two engines an hour and a half before the mail, and went regularly on, passing the Spondon station, 2½ miles short of Derhy, three quarters of an hour previous to the mail. When within a mile and a quarter of Derhy, the pumps of one of the engines were completely closed by the intense frost, the thermometer was within a degree or two of the zero point, that is full thirty degreos of cold; the train came to a stand, and the usual precautions were taken of sending back the guards, six or seven hundred yards, with red signal lamps, while the unfrozen engine conveyed the useless one to the Derhy station. The effective engine returned, and got the remainder of the luggage train again in motion, and having done so, signalised by the whistle for the guards to return. They had just got back, and the train was gathering speed, when the mail train came rapidly up, and though the red signal lamp on the last luggage wagon was in its right place, the very thick fog prevented the sight of it, and the engine with the mail and night carriages ran with extreme violence into the merchandise train. The death of the mail engine-driver and of the stoker was the melancholy and almost instantaneous consequence; but although a first-class carriage nearly full of passengers was next the engine, providentially none of them were hurt; assistance being procured from Derby, the mail proceeded northward, after an hour's delay. Immediately on the intelligence reaching Leicester, the chairman aud some of the directors, with the secretary and superintendent, proceeded to Derhy to inquire into the cause of the accident, which will also be made the subject of investigation before the coroner's inquest."

Collision on the London and Birmingham Railway.—A collision between two trains took place at the Rugby station on Sunday night, which was attended with serious injury to several of the passengers. The account of the accident, as furnished by a passenger to the *Globe*, is as follows:—"A frightful collision took place between the Birmingham and North Midland trains at Rugby, whilst the shifting of the carriages took place, on which occasion two of the latter carriages were smashed to pieces, and three persons were so dreadfully injured that they were not expected to survive but a few hours. The accident is stated to have arisen from the negligence of the officer on duty, who had the care of the red light, which he neglected to display. The Birmingham train was uninjured, and the whole calamity fell upon the North Midland. The scene was of the most appalling nature, and nearly the whole of the passengers in the two carriages were more or less injured. Every attention was paid to the sufferers, who were conveyed to the head inn, and a surgeon was in immediate attendance. Dr. John T. Veitch was one of the passengers in the train, and afforded his professional assistance, for which he was remunerated by the company on his arrival at the Euston-station." The following official account of the preceding accident differs in several particulars from the above:—"The mail-train, which left the Euston-station at half-past eight last night, on arriving at Rugby, detached two carriages, which were to proceed on to the Midland Counties line. The carriages were in the act of being passed from the London and Birmingham down line for this purpose, when the mail train, which leaves Birmingham for London at twelve p.m., arriving very slowly at the station, ran unfortunately in contact with the crossing carriages, and caused contusions to four of the passengers, and a slight fracture of the collar-bone to the fifth. Surgical attendance was at hand, and every care taken of the parties. The immediate cause of the accident is now under investigation."

An accident, which it is feared will terminate fatally, occurred on the Blackwall Railway on Tuesday evening. About a quarter past 9 o'clock, as Mr. Bowles, cash taker at the Blackwall terminus, was walking along the line between the Now-road branch and the Poplar station, the down train came up, and, proceeding on an inclined plane, was at full speed. Mr. Bowles, being deaf, did not hear the approach of the train in time to escape from the line. He was knocked down, and when picked up was in a state of total insensibility. His jaw-bone was broken, and the lower lip was split down to the chin, and a wound of frightful extent was observable in the side of the neck close to the base of the skull. He was removed to his own residence, where he now lies with faint hopes of recovery. Mr Bowles has been in the service of the company since the openii g of the line.

Accident on the Slamannan and Glasgow Railway.—On Tuesday an accident of a very serious nature, and one which might have been attended with the most fatal consequences, occurred on the Slamannan and Glasgow Railway. As it was several of the passengers were severely injured, and all of them were thrown into a state of the utmost consternation and alarm. When the evening train, with about from fifty to sixty passengers, was within a few miles of Glasgow, the engine, then going at a very rapid rate, in order, it is said, to make up time lost on the road, was suddenly thrown off the rails, and the second and first class carriages were in consequence overturned, with extreme violence, on opposite sides of the road. No lives were lost; and it is only proper to say, that the utmost attention was paid to tho sufferers by the officers of the company, and also by those inhabitants of the neighborhood who were drawn to tho spot immediately on the occurrence of the accident.—*Edinburgh Observer.*

FOREIGN RAILWAYS.

SAFETY OF STEAM CONVEYANCE.

At the commencement of the working of the Belgian railroads, the accidents from the explosion of steam-engines which then occurred, induced the administration to issue the following regulation, which forms the twenty-first article of the royal decree of the 24th June, 1839, relative to railroads:—

"Our Minister of Public Works will publish every year in the *Moniteur* an account of all the accidents that have happened to the steam-engines of every kind during the past year. This account will mention the name of the boiler-maker, and of the owner of the engine; the effects produced by the accident; and the known, or assumed causes to which the accidents are attributed."

This year, in accordance with this regulation, the Minister of Public Works announces in the *Moniteur Belge*, that it appears from the reports transmitted to him, that, during the year 1840, *no accident* has occurred.

These reports comprise not only the stationary steam-engines, the number of which in the kingdom amounts to 1,100, but also those of the steam-boats and the locomotives on railways. This extraordinary absence of accidents is a proof of the care with which the trains on the railways are

conducted, and of the safety, so far as the explosion of boilers is concerned, of steam conveyance; which, in its origin, occasioned such imaginary and extraordinary alarms.

Great activity is displayed in tracing the Coburg railroad, which is to connect Coburg, Hildburghausen, Meiningen, Gotha, Weimar, Erfurt, and Eisenart, and is to join the Prussian railroad farther north. The work will begin in spring. What an advantage when this is finished! A traveller can go in two days to Nuremburg, the centre of South German commeree, or from Bamberg, the junction of the Main and the navigation of the Ludwig Canal, to Berlin, or Bremen, or Hamburgh.—*Franconian Mercury.*

The *Constitutionnel* announces that the fate of the Orleans Railroad is compromised. In this statement it must be wrong. Before the 1st of January the company might have renounced its engagements. It is now too late. The engineers of the company want to go through the passage of Etampes at the inclination of a centimetre, thus concentrating on a single point the whole inclination of the line. Mr. Brunel has done this on the Bristol railroad with success. But the administration of roads and bridges will not hear of this. It insists on the company's reducing the inclination to four millimetres, which would cause an increased expense of from five to six millions; the company consents to make it eight millimetres, but its proposal is rejected. M. Toste seems not to favor the Orleans line, hoping, it is said, to make the Left Bank Versailles Railroad tho terminus of a new Orleans line.

Railroad from Bale to Zurich.—The commissioners empowered by the government of Argovia, met a few days ago to examine the proposed grant for the construction of a railroad to pass through that territory. Two deputies from the managers of the road assisted at tho deliberations of the commissioners. They report that a very favorable reception was given to the propositions they were ordered to make relative to certain arrangements of tho plan, which would otherwise have rendered the undertaking difficult, if not wholly impossible.

Durability of Locomotives.—It is often asked how many miles one locomotive travels, and how long it lasts. The following are the statements respecting the first locomotive which went on the Belgian railways. This locomotive, is *la Flèche.* It began to run in May 1835; since that time to the 30th of last November, it has travelled 16,569 leagues of 5,000 metres, the distance of twice round the world, and has only required one repair which cost 9,361 francs.—*Le Fanal.*

The Versailles and St. Cloud Railway Company have just established a line of signals from Paris to St. Cloud. They are discs of about two feet diameter placed upon moveable pivots, and at night are lighted with lanterns fixed in the centre.

RAILWAY TRAIN IN A SNOW STORM.

The following graphic account of a railway passenger's adventures between New York and Philadelphia, is taken from an American paper just received.

"The snow storm, which commenced on Friday evening and endured until Sunday night, accompanied all the while with a fierce north-east wind, will be long remembered by those who were travelling on Saturday between New York and Philadelphia. As the night closed in, the storm increased; nevertheless, the distance between Camden and Bordentown was run over in reasonable time, considering the obstructions of the snow drifts; but when the road between Bordentown and Trenton, which is a side cut along the canal, and laid with flat bars, came to be passed over, our troubles began. In anticipation thereof, we were provided with two engines—one to draw and the other to push.

"Soon the engines began to labor—now dashing with irresistible impetus through snow banks, and then the wheels flying round without adhesion, owing to the slipperiness of the rails, and ever and anon the struggling giant, that yet urged us onward, would seem, by his deep drawn sighs, to intimate that his powers were almost exhausted. Still we advanced gaily—for there is excitement in difficulty, and though proceeding slowly, we yet believed we should get through. But suddenly, while under great headway, we felt a sharp check, which seemed, by the straining efforts of our fire steeds, to be formidable indeed; they labored strenuously, but with perceptibly decreasing effect, till, after one long convulsive breathing, all became still. We then found ourselves deeply imbedded in a snow drift, and, what was not less unfavorable, we soon perceived a-head of us, and also brought up on a snow bank, the mail train from New York. It was then about twelve o'clock. Our only course now was, as there was no turn-out, to endeavour to get the train back to Bordentown, and accordingly all hands and the engines were at work to fire up and retrace our steps. But, alas! going back was as much out of the question as going forward. We were stuck fast, and vain were the attempts of the locomotives to stir us from the spot. After a brief consultation the engine in the rear was detached, and ordered back to Bordentown to bring up reinforcements. Tho interim of some two hours was not without its incidents or alternations of hope and disappointment, moodiness and merriment.

"While this was going on with our train, that from New York, from which we now began to hear, was not idle. In the first place, the train was separated, and the ladies' car, with one other, were dropped, and the engine, with the baggage trucks and forward car, tried to get on. It advanced nearly a mile, and within a few hundred yards of ours, when the engine gave out. Some of the passengers came through the snow—no little undertaking, for it drifted in some spots leg deep—to our cars, and gave us the first tidings that the ladies' car, in which were some twenty ladies and children, was left a mile behind. This redoubled the anxiety of all for the arrival of the engines from Bordentown, and at last their distant fires were seen, one, two, three, and with such a force deliverance seemed at hand. Still their slow approach indicated increased difficulty in forcing their way. The wind and snow were fiercely raging, and doubts of the probability of extricating all the cars began to circulate. Finally the nearest car was reached, two engines were attached a-head, and with the aid of that which had brought us on, and now aided to push us back, slowly, and after repeated checks, we were re-conveyed to Bordentown, which wo reached about three to o'clock.

"The engines were all then sent back to bring in the New York train, but the increased violence of the wind, which whirled the snow in eddies on the road, rendered all efforts useless, and one by one the engines gave out without reaching the cars, and were frozen up on the track. The men succeeded in scrambling back, exhausted, and almost perished with cold, to the town. Thus, then, about half-past four o'clock, it became certain that the passengers of the whole New York train, except the few who had succeeded in reaching the Philadelphia train, would be left till morning in the cars. It was a vain effort to obtain sleighs, or any other mode of reaching them; the canal on one side, and morassy fields on tho other side of the road, precluded approach in the night, and the drifts on the roads itself rendered a passago of sleighs on it impracticable. The only consolation was, that of knowing there was fuel enough to keep up good fires.

"Sunday morning came in dull, dreary, and boisterous, the snow and wind still prevailing. All the force that could be mustered was early at work with snow-ploughs and scrapers, and spadesmen, to extricate engines and cars frozen up; but as their progress was slow, some of the passengers determined to approach the ladies' car, as near as they could with sleighs, and taking with them hot coffee and hot milk for the children, with wine and various eatables, they started, but it was past midday before any tidings were had of them. Meantime, through great difficulties, and one by one, the engines left on the road the night before were brought back.

"About one o'clock we were cheered by the return of the sleighs, having the women and children, who thus, after twenty hours passed in the cars, were brought to the hotel in safety, and without having suffered much. The only mode of reaching the cars where they were was by passing through the fields."

CALLS ON RAILWAY SHARES.

In the Court of Queen's Bench on Wednesday, Lord Denman gave judgment in the case of the Directors of the Birmingham, Bristol, and Thames Junction Railway Company *versus* Locke, in which the Court had taken time to consider its decision. His lordship said this was an action brought by the plaintiffs to recover from the defendant the amount of certain calls on shares which he had taken in the company. The verdict passed for the plaintiffs, and a rule *nisi* for a new trial was subsequently obtained. The proof of the defendant being a member of the company, liable to this action, was disputed. It was contended that the manner in which the registry-book of the company, where the names of the members were entered, was kept, was irregular. That objection had just been disposed of in a judgment delivered a short time since in the Exchequer Chamber, in a case where a similar point arose, the case of the Grand Junction Railway Company *v.* Freeman, where the registry-book, though irregularly kept, was held to be *prima facie* evidence of a party's liability. That case, too, decided another point—namely, that the holders of scrip certificates were decided to be proprietors, although they had not signed the parliamentary contract. In the present case there was another point. The directors had declared in the usual manner that the shares of the defendant were forfeited. It was contended that after such declaration an action like the present could not be maintained. The answer to that objection was, that such declaration of forfeiture did not take full effect until it had been reported at, and had received the sanction of, a general meeting, and such had not been the case in the present instance; and in the Court of Exchequer Chamber it had also been held that a mere notice of forfeiture did not exempt a party from liability to calls. On all these grounds, therefore, this Court was of opinion that the present rule for setting aside the verdict must be discharged.—Rule discharged. The Directors of the Grand Junction Railway Company *v.* Graham—Same *v.* Gunston. Lord Denman said that, in these cases, questions similar to those already decided in the last had arisen and been discussed, and in them, too, the rules for new trials must be discharged.

In the Court of Exchequer, on the same day, arguments of counsel were heard on the case of the Sheffield and Manchester Railway Company *v.* Woodcock. It was an action for calls, tried at the last Summer Assizes for Liverpool, before Baron Rolfe, when a verdict was taken for the plaintiffs, subject to various objections, arising upon the Act of Parliament (statute 7 Wm. IV., cap. 21) under which the company is established. The objections were to the effect that the company was not legally constituted when the calls were agreed upon; that one of the calls was prospective, and therefore illegal; and that the resolution directing a call was invalid by omitting to specify the time and place at which the payment was to be made. There was also an objection that the defendant was not a proprietor liable to calls until his shares were registered; but this objection was stated to have been disposed of by a judgment pronounced in the Ex-

chequer Chamber, in which the Barons had all concurred. A rule *nisi* having been granted in the last term, the several objections were argued by counsel at great length, and the Court took time to consider its judgment, observing that the question was one of great importance, and that its decision would determine several other cases.

TO CORRESPONDENTS.

A. B. C. *must perceive that the special object of his inquiry does not admit of a satisfactory answer in the limits of an ordinary notice to correspondents. If he will call at our office, or favor us with his address, we shall be happy to give him our opinion on the points in question, gratis. In the meantime we answer his minor queries.*

1. *The specifications of Patents can be read at the Enrollment, Petty Bag, or Rolls' Chapel Office, at one or the other of which every Specification is enrolled. There is a small fee of* 1s. *or* 3s. 6d. *to be paid.*

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Notices of several works sent for review are unavoidably postponed.

C. S. *and other correspondents are under consideration.*

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 18 ARE NOW READY.

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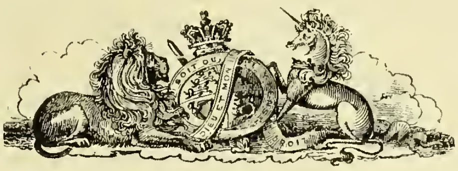

THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, JANUARY 16, 1841.

The INDEX *and Title Page, for the Third Volume of the* INVENTORS' ADVOCATE, *will be Published next week.*

The lively interest which railway accidents excite arises partly from the magnitude of the interests at stake, and the extent to which such calamities might probably reach; but it may be principally attributed to the selfish consideration, that it is a danger to which we may be ourselves exposed. It is this "fellow feeling" that makes us shudder with horror at any thing that happens to our neighbors, and might have happened to ourselves; whilst we look with philosophical indifference on calamities of much greater magnitude, that seem removed from our sphere of action. We hear of a coal mine explosion in the north, that has destroyed twenty or thirty lives, without much shock to the nervous system; or of the explosion of a gunpowder magazine at St. Jean d'Acre, killing fifteen hundred fellow beings, with more of astonishment than alarm, or even of commiseration; because we feel no apprehension of being exposed to the explosion of either "fire-damp" or powder magazines. But if it should chance that one person has been run over by a carriage, or killed by a railway collision, our sympathies are immediately excited, and we are eager to have regulations enforced to punish the assumed offenders, as a caution to those who might run over or crash ourselves. So narrowed are our sympathies in this respect, that the same accident is considered with more or less of horror, in proportion as the persons who have received injury are similar in station, and occupy the same kind of carriages that we should have occupied in similar circumstances. If the engine-driver, stoker, or guard be killed, that is an affair of engine-drivers, stokers, and guards. It touches not us, excepting in its relation to the passengers whose lives were risked in the same train. If a passenger be the sufferer, the case immediately alters; the cause of death must then be strictly inquired into, and punishment must fall heavily on some one, as a caution for the future, when we may be travelling in such a carriage on the same road.

This is the secret motive of the great outcry against railways, when any fatal accident occurs. Every body feels an interest in the security of that mode of conveyance, consequently every body is ready to exclaim against the system of management if it be not so perfect as it might be; and all are eager for the adoption of means to prevent railway accidents in future. The anxiety to render this means of conveyance as perfect as possible, though based on a selfish motive, is calculated to do much good; as it must stimulate the directors to the adoption of every possible means to lessen the risk of danger. At the same time it is to be wished that the same spirit would take a more extended range, and comprise within its sympathies the numerous casualties that are constantly occurring from the use of machinery, and the neglect of proper precautions, in our manufactories and mines.

The loss of life in our mines and factories, which might have been prevented had better machinery been employed, or more care been taken in the construction of the works, remains unknown, and is generally little cared for; but we may venture to assert that the number in one week exceeds the total loss of life on railways during the course of the past year. In the Wolverhampton district alone we have noticed as many as eight or ten inquests held in one week by the same coroner on the bodies of persons killed in various ways in that metal-working neighbourhood; most of which accidents were attributable to defective machinery. It is far from an unfrequent occurrence that the rope fixed to the windlass of a mine-shaft is allowed to wear away until it at length breaks in the use; and it rends asunder, may be, when the miners are descending in the bucket. In a case of this kind, where the saving of expense is more regarded than the lives of the men employed, the managers are infinitely more culpable than in any case of neglect that has yet been alleged against the directors of railroads; though the amount of deodands awarded by the juries against the latter bear a vast disproportion to the trifling sums in which the mining proprietors are mulcted in the other. If the poor miners were summoned as jurymen, the case might be different. They might be induced to levy on the defective rope—the cause of death—a deodand equal to that which a passenger-jury is disposed to levy for the missing signal, or the incompetent engine-driver. The neglect in the one case is more directly culpable than in the other, because the danger of the worn-away rope is the more apparent and certain. The unequal distribution of punishment marks how strongly sympathy in cases connected with ourselves can determine the scales of justice.

There is, indeed, this difference between the cases of railway accidents and those arising from machinery—that as the safety of railway conveyance affects more extensively the interests as well as the sympathies of the people, it is the more essential that railways should be conducted with the greatest possible care, so as to prevent that important means

of communication from being limited in its operation by apprehensions of personal danger. Viewing the directors of those important undertakings as trustees for the public, as well as for the private interests of their respective companies, they are more responsible for a neglect of public duty than merely private traders. It is only in this view of the case that the somewhat severe decisions of coroners' juries in recent cases—in one especially—can be justified, or regarded as in the least degree consistent with the decisions in cases of much greater culpability. We wish, indeed, that coroners' juries were generally more strict in their awards of deodands when deaths are occasioned by culpable neglect, as that is frequently the only means of punishing offenders; but they should, at the same time, be cautious not to allow their personal feelings to hurry them to decisions which impartial and cool judgment would condemn.

We have this week recorded three collisions on railways, each of which took place in nearly similar circumstances; an advanced train being overtaken and run against by the train following. In these accidents it is evident there must have been gross neglect either in giving, or want of attention, to the danger signals. There are contradictory accounts as to the state of the weather at the times of the collisions. One statement represents the accident on the North Midland Railway to have occurred on a clear night, with the moon shining brightly. The official report represents the weather to have been foggy in every instance. If the latter were the case, the neglect must have arisen from the want of proper signals; if the former, the fault lay with those who have paid with their lives for the omission of duty. The increase of these accidents from collision, shows the necessity of adopting other and more effective regulations, both as to the signals and the engine-drivers. Every one that occurs affords a cautionary example of the necessity of an alteration in the existing arrangements. The regulations on the Belgian chain of railroads, a part of which is published in our present number, exhibit much greater precautions against danger than is witnessed in the railroad arrangements in this country; and the result is, that fewer accidents occur. We trust that the railway conference will follow in this respect the example of the Belgian Government; and if they reject our plan of appointing captains, and of having stationary signals of danger, as innovations not sanctioned by experience, that they will not fail to adopt regulations the excellence of which, so far as they go, have been tested by the experience of several years.

NEW INVENTIONS.

NEW MODE OF PROPELLING AND STEERING STEAM VESSELS.

Captain E. J. Carpenter has taken out a patent for a new method of propelling and steering steam-ships. It appears to be founded on, and to be an improvement of, the Archimedean screw. In Captain Edwards's invention, the axles, on which are fixed the floats, or blades as they are termed, that act upon the water, project from each side of the quarter of the ship, and are in the form of portions of the worm of a screw; or are placed obliquely to the axle, so as to work on the same principle as the Archimedean screw. The blades work vertically, entirely under water, in the same manner as the screw, and are so placed at the stern that there are no projections on the sides, beyond the width of the ship. One great advantage of this mode of arrangement arises from its adaptation to steering ships, without the use of a rudder. Captain Edwards has thus realised the notion which we published in a former number of the INVENTORS' ADVOCATE. It has long been our opinion, that the old plan of steering, by obstructing the progress of ships on one side or the other, with a rudder, might, on steam vessels, be advantageously superseded by the application of propellers. The mode in which this object is accomplished in this invention is by making the axles of the blades capable of being moved horizontally, and by adapting to the capstan bevelled gearing to effect that purpose. Thus, where it is required to alter the course of a ship, the direction of the action of the revolving blades may be changed, by moving the axles on which they revolve to the right or the left, so as to turn the head of the vessel. The advantage of this mode of steering is, that the motion of the vessel is not retarded, as it must necessarily be when the rudder is employed; and the vessel, it is calculated, will obey the guidance of the propellers much more quickly than it can from the mere re-action of the water on the rudder. We perceive, however, that Captain Edwards rather distrusts the action of his propellers in steering, for in all the drawings of his invention, rudders are represented as being attached to the vessels, together with the propelling apparatus. We conceive that the propellers would be found adequate for the purpose alone. By another arrangement in the machinery the propellers are so contrived as to be readily lifted out of the water, to be cleared from weeds or repaired when necessary. The inventor conceives that from the contrivances he has adopted for fixing the axles of the propellers to the ship, there will be less strain on the timbers, that the motion of the engines will be less felt—and that the action of the blades on the water will be best adapted to propel the vessel with the greatest effect.

SOUND MADE VISIBLE.

A correspondent at Manchester has forwarded to us the following notice of an "important discovery," which seems to surpass even that of M. Daguerre—it is no less than a plan of rendering the vibrations of *sound permanently visible.* We give the description in our correspondent's own words:—

"A most ingenious and valuable discovery has just been made by Mr. Southworth, of Cheetham-street, Manchester, by means of which, an individual, although unacquainted with the art of writing, is enabled to take down the speech even of the most rapid speaker; and, what is yet more surprising, in such a way as to indicate the peculiar emphasis with which it may be delivered.

"As the inventor has not yet secured a patent, all that we are at present enabled to state is, that it bears some analogy to photogenic drawing. It is well known in the latter case, that when a substance properly prepared is presented to objects illuminated by the rays of the sun, it receives a distinct and faithful impression of them, which is afterwards rendered permanent by suitable chemical agents. So also the present discovery consists of a piece of mechanism, as susceptible of the impression of sounds as the tympanum of the ear, which impression remains permanent, and is as perfectly legible as the clearest typography."

INDIA RUBBER PAVEMENT.

India-rubber appears to have no limits to its power of application; but we certainly should not have expected to see it applied for the purposes of pavement. This, however, is about to be attempted. We take the following notice of it from an evening paper:—"Amongst the marvels of the times, a patent has actually been taken out for paving the streets of London with India-rubber, and many scientific persons are sanguine as to its success. There is to be a substratum of wood, on which is to be put a facing of caoutchouc, mixed with iron filings and sawdust, to a depth of several inches. This, it is calculated, will resist the ill-influence of all weathers, and make the most delightful and durable pavement." What benefit is intended to be derived from a pavement of India rubber, we do not know. We should imagine that durability is not one of its proposed advantages; and if its elasticity is supposed to recommend it, the projectors will find themselves much disappointed.

INSTRUMENT FOR MEASURING REFRACTION.

At the meeting of the Royal Physical Society of Edinburgh, on Tuesday last, Dr. Wilson exhibited an instrument for measuring the refracting powers of different substances, invented by Mr. Alexander Bryson, of Edinburgh. The instrument consists of a compound microscope with a moveable platform underneath, for holding the refracting medium over a fine line which is to be viewed through it. The platform must be raised or lowered until the line is distinctly seen through the microscope, and as the distance at which this takes place depends on the refracting power of the medium, the graduated scale on which the platform moves indicates the refracting power. Dr. Wilson considered the invention of great importance to the mineralogist and the chemist, as it enables them to ascertain the refracting power of very minute substances.

A NEW MUSICAL INSTRUMENT.

A Rock Harmonicon, formed of stones found in the neighborhood of Skiddaw, and played upon by the discoverer's three sons, is now performing at Liverpool. The *Whitehaven Herald* says—"The inventor of this strange work of art is a plain Cumberland yeoman, from near Keswick, and the rude materials from which he contrives to extract the most enchanting harmony, are nothing more than a collection of slates or stones from the more unfrequented parts of the mighty Skiddaw. These are arranged in such a manner as to enable three persons to beat upon them at the same time with small wooden mallets; and this is accomplished with so much dexterity and skill, as to distil from the rudest possible materials the most rich and delightful melody of sweet sounds that ear ever heard, or imagination can conceive. The effect is perfectly magical, and the listener stands entranced and wonderstruck. Men of undoubted musical science have inspected this novel instrument, and have given a most flattering opinion of the work which the inventor has achieved, and also of its vast capabilities." The *Tyne Mercury* throws some discredit on the originality and newness of the invention. "It would seem," says that journal, "old things become new again. We saw a collection of stones played on with a hammer at one of the museums at Keswick thirty years ago."

PROPOSED BRIDGE OR TUNNEL FROM DOVER TO CALAIS.

A Havre journal gives the following account of a project announced in that town. An Englishman describing himself to be an engineer, recently arrived at Havre, who has been to Paris to propose the plan of a passage by land from Dover to Calais. The inventor has given the following account of his gigantic plan to many of the inhabitants of Havre. M. W. Coppitt (the inventor) proposes to place twenty thousand piers of stone across the straits, which are to be laid at the bottom of the sea. These are intended to form the foundations of a monstrous bridge seven leagues in length. A plan of this has been engraved in London, and will be publicly exhibited in Paris. According to

the inventor's account he gives the soundings of the straits with great exactness, and the various depths of the sea along this extensive line. The estimated expense of this bridge is *not to exceed* 1,800 millions of francs. Though the plan of cones or piers in imitation of the dike at Cherbourg may appear ridiculous, M. W. Coppitt is an ingenious man, and his determination being that England shall be united with the Continent, he has another project to effect it. His plan, number 2, is this: It is not to travel above the surface of the water, but underneath it, nevertheless on dry and firm ground. In order to accomplish this M. W. Coppitt proposes to fix a series of tunnels made of cast iron, three feet in thickness, and eighteen feet diameter inside. The first of these tunnels, which is to serve as its entrance, is to be placed at Dover, and the last to terminate at Calais, after following the undulations of the submarine ground. "This plan is simple," modestly says the inventor; "and the execution of it so casy, that I dare not claim any merit for the discovery. You will understand," he adds, "that if your countryman, M. Bruuel, had thought of this plan, instead of excavating with so much difficulty through a soil of sand at the risk of a thousand accidents, he would have laid down long iron pipes from one bank of the Thames to the other, by the adoption of this method, with a saving of twenty millions of francs in money and ten years of labor." M. W. Coppitt thinks that his metal tunnel from Dover to Calais would *not cost more* than 1,000 millions of francs; half of which he proposes should be contributed by France and the other half by England.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING JANUARY 18, 1841.

Monday,	Statistical Society	8	P.M.
	Medical Society	8	P.M.
Tuesday,	Linnæan Society	8	P.M
	Horticultural Society	3	P.M.
	Institution of Civil Engineers (Anniv.)	8	P.M.
Wednesday,	Geological Society	8½	P.M.
	Society of Arts	7½	P.M
	London Institution	7	P.M.
Thursday,	Royal Society	8½	P.M.
	Society of Antiquaries	8	P.M.
	Scientific Society of London	8	P.M.
Friday,	Royal Institution	8½	P.M.
Saturday,	Westminster Medical Society	8	P.M.
	Mathematical Society	8	P.M.

INSTITUTION OF CIVIL ENGINEERS.

Jan. 12. Joshua Field, Esq., V.P., in the Chair.

On Tuesday last this well-organised and practical society met for the first time this session, when Sir Charles Baird was proposed as a member, and the following gentlemen as associates:—Samuel Beasley, Wm. Gossedge, John Hughes, John Hopkins, and Dr. Schaffer. This being the meeting previous to the anniversary, the list of gentlemen proposed by the council to fill the post of officers for the year ensuing was read from the chair; the ballot will take place on Tuesday next, the anniversary of the institution. A very beautiful model of Mr. Hicks' improved plank frame, was in the meeting room for inspection. The abstract of a paper by Mr. Davidson, on "A Refrigerator for cooling Brewers' Wort" was read. The communication entered into a variety of modes of cooling hot liquor which had been tried by Mr. D., of which the following are a few. The comparative degree of evaporation produced by the current of air driven with considerable force over the surface of the hot wort, as contrasted with the ordinary method, viz., by exposure to air under common circumstances. From the experiments made it was found that when air is projected over the surface of the wort at a greater velocity than 84 miles, it became prejudicial, the wort being blown from the vessel. Another plan was by causing the wort to run over a slight inclined plane, fanning it at the same time with a fan wheel. The refrigerator consists of a number of vertical pipes, packed together and level at the top; the wort is made to pass down an inclined plane, in a shallow stream upon the open ends of the pipes, which are kept cool by air blown up outside the tubes.

A description of a crane capable of lifting 30 tons weight was read, from Mr. James Leslie. By means of this crane eight men can raise the above weight, and one man can turn it in the required direction. It was made and erected by Mr. Borrey of Dundee. Mr. T. J. Maud communicated some remarks "on the Repairs of the Menai Bridge." It will be remembered that on the 7th of January, 1839, this bridge received much damage by the storm, and has taken 130 tons of iron and wood (Kyanized) to repair the same. A paper was also read by Mr. Seaward, connected with marine and other steam engines. An interesting paper was likewise brought before the society, being the result of some experiments made with a view to determine the strength requisite to punch holes through plates of iron and copper of various thicknesses, and to estimate the force to work the instrument. The machine or instrument used for the purpose is a very long lever, with weights attached to the end farthest from the punch. The experimenter found that to punch or pierce an iron plate eight hundredths of an inch in thickness requires 66,200 lbs. The use of oil is found to reduce it one eighth per cent. A formula was given with the paper. The subject led to much discussion.

A letter was read from Mr. Sopwith, on the advantages which would accrue to the science of geology if the Institution of Civil Engineers would lend their aid, the members individually, to assist the committee appointed by the British Association at Glasgow last year, in drawing plans of strata in those parts of the country where the members might be called in their avocations. The committee of the British Association have caused a map or plan to be printed, in which will be found to a scale an outline or section of the midland counties (especially where coal is mostly found), and which will serve as a guide for them to work from, should they be inclined to render their assistance. It cannot be considered a matter of surprise that since the various excavations have taken place in the construction of railroads, &c., geologists have reaped many interesting and important facts. The *cropping out*, as it is technically termed, of the seam of coal in the midland counties, detected by an excavation, led to the discovery of some very valuable coal mines, at the present time worked by Mr. Stephenson. Mr. Sopwith was present, and explained to the meeting the objects proposed by the British Association, of which he was a member of the committee deputed to examine into the affair. He stated that it occurred to many of the leading members of the Geological Section, that the civil engineers might materially assist them in their inquiries if they were placed in a position so to do, without much inconvenience, and, with that in view, the simple *map* or *plan* had been drawn up, which was furnished by Professor Phillips, of York, and had received the sanction of Dr. Buckland, De la Beche, and others; and Mr. S appeared on this occasion to explain and propose the subject to the body of engineers, with a view to receive their opinions, suggestions, and sanction prior to forwarding the plan to the several engineers actively engaged throughout the country. He also stated that young gentlemen, training for the profession, and who would supply such sections, &c., would be remunerated in proportion to the state of the funds allowed by the British Association for the purpose, which amounts to £200. It was also stated that should the sum just named be not sufficient for the purpose of carrying out the proposed object, but little doubt was entertained that Government (through the Museum of Economic Geology) would lend their aid. It is requisite that the drawings or plans should be made shortly after the excavation has been effected, as the soil soon becomes covered by the various efforts of nature to clad it with verdure, to prevent its being washed down (the loose earth being bound together by the fibrils of the roots), or, should nature fail in the attempt, every precaution is made by man to effect this object; by this means in the course of a few months the whole is covered, and little or no traces left of the original stratification.

There can be but little doubt that such a combination of the two sciences of geology and engineering would work hand in hand together, and be the means of developing to the minds of the young engineer those astonishing and wonderful facts the comprehensive science of geology reveals.

Mr. Sopwith attended, and explained his very beautiful hand models, illustrative of the most interesting matters connected with geology. Want of space will not permit us to notice them on this occasion; we hope however to be able to do so at a future time.

It was proposed and seconded that the new council on their election do take into mature consideration one of the principal objects for which the institution was formed, and which, as far as 20 years back, stands in the rules, viz., "that lectures on interesting branches of popular science, connected with the practice of civil engineering, be delivered from time to time during the session," which was most cordially received by all present.

SOCIETY OF ARTS.

Jan. 13. — Moore, Esq., in the Chair.
(Illustration Meeting).

Owing to the indisposition of Mr. Arthur Aikin, the illustration announced for this evening "On Woody Fibre, its structure and uses," was postponed until the second Wednesday in February. In his place Mr. Anstey kindly favored the society with some remarks "On the construction of stoves for warming apartments, hot-houses and conservatories in particular." The principal object he had in view was to point out the difference between air heated, and the warmth produced by radiation in the production of an artificial climate which should be healthful both for animals and plants.

His attention was attracted to the subject some years since, when erecting a conservatory in the gardens of the Horticultural Society at Chiswick. The house is built entirely of glass, the size of which was stated to be 108 feet long, 30 feet wide, and 25 feet high. It was supposed that this extensive house would require a much larger consumption of fuel to warm it, owing to its being made exclusively of glass, but this was found to be erroneous; the mode of heating it in the most effectual manner, having been entered into in every detail, as contrasted with the ordinary conservatories erected with a brick wall forming one side, prior to erecting it. It was found that the best heat is produced when the surfaces, which are intended to radiate the heat, are raised to a temperature averaging between 100 deg. and 200 deg. Fahrenheit; but this is to be estimated only when an open fire is impracticable or inconvenient.

The plan adopted by Mr. Ainstey in warming the glass conservatory above mentioned, was by placing hot pipes near the floor, within the building, so that the plants received the heat by direct radiation alone, at least the majority of them. Independent of this advantage, the air which thus becomes heated rises to the upper part of the conservatory, where it is met by heated air warmed in a chamber some 60 feet or more from the glass-house, and which is conveyed in a subterranean tile drain, at little or no loss of heat (according to Mr. Ainstey's experience). This heated air is made to ascend in pipes around the interior of the glass-house, which has an area of glass of 11,000 square feet, and is warmed by 270,000 feet of pipe.

He alluded to the experiments of Melloni on *Diathermacy*, in which are found stated many very interesting facts. All heat which is radiated from surfaces at a temperature above 300 deg. of Fahrenheit, is entirely cut off by a plate or sheet of glass, and in as perfect a manner as if a brick wall were interposed. A sheet of glass allows, however, the light and heat radiated from the sun to pass through

it; but when the surface is slightly heated, then this transmission of heat is stopped.

The only pleasant heat (save that of the open fire) is that obtained by radiation, and the most prejudicial kind that eliminated as heated air. Both animals and plants prefer a warm radiation and a cool temperature. Houses warmed by heated air have been found very prejudicial in menageries. In the warming of green-houses, it has been lately an object to supply the earth with a portion of the radiated heat, which is effected by the pipes being placed near to the ground, as roots have been found to require equally as much heat as the leaves; under ordinary circumstances, the earth receives its heat from the sun, and is generally warmer than the surrounding atmosphere.

But few, out of the numerous plans lately proposed and adopted, appears, says Mr. Ainstey, to surpass that which has become nearly exploded, viz., the old *smoke flue*, solely on account of the difficulty in preventing the escape of the smoke.

In conclusion the lecturer stated, that the result of his observations on the warming of various apartments in dwelling houses, &c., with the numerous and fashionable methods of late recommended, was, that an open fire is not only more economical, but more healthy than a close stove,—the requisites for the proper performance of the former are a hole of sufficient size in the register to allow of the air admitted in the room to escape, and also to regulate the admission of a due proportion of air to cause the required draft.

ZOOLOGICAL SOCIETY.

Jan. 7. B. B. Cabbell, Esq., F.R.S., V.P., in the Chair.

(General Business.)

The secretary announced that the balance in hand at the last general meeting was £464 1s. 8d.; the receipts during the past month amounted to £270 1s. 7d.;—making in all £734 4s. 2d. The disbursements in the month of Dec. were £578 13s. 2d., leaving a balance in the hands of the treasurer of £151 10s. 1d. Among other donations announced, was that of a Newfoundland dog, presented by Prince Albert. The number of visitors to the Museum during the last month amounted to 189, and to the Gardens in Regent's Park to 1,736, from whom £52 11s. had been received.

[It may not be generally known to our readers, that the museum of the Zoological Society is about to be removed from Leicester-square before the next quarter-day, at which time their present lease expires. The difficulty of finding space sufficiently ample for their extensive series of specimens, and the great expense which necessarily awaits the society if they attempt to build a museum at the gardens of the Regent's Park (of which there has been some talk), has suggested a plan to some of the leading members, which, were it carried into execution, would at once rid the society of a very considerable annual disbursement; and thus the whole of their funds might be expended on the living animals at the gardens.

Mr. John Edward Gray, keeper of the Zoological collection of the British Museum, has been very active in proposing to the council of the Zoological Society, the very many benefits and advantages there would be derived by uniting the two great collections of Natural History. Such a union would prove of the utmost benefit to zoology, as it would afford naturalists the opportunity of comparing side by side the various typical species; whilst every facility would be afforded in the British Museum to enable the members of the society to describe, compare, and examine the specimens on the private days, and to have every advantage of consulting and contrasting the society's collection with the National one. There cannot be a doubt that should such a union be effected, the Natural History department of the British Museum would surpass that of Paris, Vienna, and others on the continent.]

URANIAN SOCIETY.

Tuesday, January 5th. W. D. Saull, Esq., V.P., in the Chair.

A paper on the asteroids and shooting stars, by Mr. W. H. White, was read.

The author commenced by giving a chronological history of falling meteors, or stones, and shooting stars, from the earliest period of observation up to the present, with the opinions of several philosophers, both ancient and modern.

In the writings of the Greeks and Romans, frequent allusion is made to meteors. We read that in the reign of *Numa* the Ancyla, or sacred shield, fell. Anaxa goras describes a large stone which fell at Arguspotamos, about 466 B.C., to be as large as a cart (no mention is made of the size of the cart), and of a burnt color, and hence he supposed it came from the sun. In the nights of the 13th and 14th of November, 1833, shooting stars appeared in such numbers, and moved with such regularity of direction, as to present the phenomena in a most surprising and new point of view. An observer at Boston (United States) describes them as falling in such numbers that it was impossible to count them, and he compared their appearance to that of the flakes of snow in an ordinary snow storm; and when the numbers had so diminished as to enable him to count them, he numbered 650 in a quarter of an hour! Fortunately, collateral evidence confirmed this, and other facts equally striking. Men of known veracity in Europe have given their undoubted testimony to an unusually great number of shooting stars at this season of the year. Their altitude as well as their numbers seem to have been the subject of conflicting opinions, while nearly all agree as to a single radiant point, viz. *Aries* in *Liones*. The author has given a table showing the sun's declination, and also of several stars, about the period of falling stars, which appeared to support the opinion of a radiant point, that is, *Aries* in *Liones* for August, and *Virgo* for November. The most accurate observers of shooting stars tell us, that some have traversed over an arch of 25 deg. of a great circle in a second of time. Taking the altitude of these meteors (says the author) at 600 miles, which may probably be above the truth, by a simple calculation their apparent velocity is above 500 miles per second, which is eleven times above that of the earth in its orbit, or about 46,928,000, miles per day; a velocity that outstrips the fastest comet at its perihelion! From the various phenomena which these metors present, the author concludes that few, if any, ever actually fall to the surface of the earth, or even descend so low as the regions of the lowest stratum of clouds, which he thinks very probable, from the circumstance of their not being visible in a cloudy and overcast sky; and that no person has ever been able to obtain a specimen of these mysterious nocturnal aerial visitants; that falling stars always appear without noise, and leave no odour behind them; that they always become extinguished before they reach the earth; that the brilliancy of their light could not be communicated to them by the sun; that a great number are beyond the limits of the earth's atmosphere; that their velocity bears no relation to the velocity of the planets of the solar system; that their trajectories are neither confined to any constellation, nor obey any particular line of direction; that meteors in their physical condition bear no analogy to those of planetary bodies; that falling stars are not confined to the two periods of August and November, but are observed on the 10th October, and the 6th and 7th December, and 2d January; and lastly, that both meteors and auroræ boreales have their origin from the same source, but under different modifications,—viz. electricity, or some etherial matter analogous to it, which is developed in celestial space, as we see it in the beautiful phenomena we are now contemplating.

After the reading of the paper, a short discussion took place between the members, as to the probable cause of the phenomena being witnessed generally on particular days in the year.

Mr. C. A. Bowdler considered it probable that the earth passed at certain periods of the year through a stream, or current, of electricity, flowing in radiant lines of direction from some nebulæ or cluster of stars to our sun, and that the shooting stars were merely "*electric scintillations*," caused by a neutralisation of electricity in the gaseous matter floating above the earth's atmosphere, the continual falling, or showers, being a succession of such electric discharges before reaching our earth. Mr. White and the members present concurred with Mr. Bowdler. The meeting adjourned to the 2d February.

SCIENTIFIC CORRESPONDENCE.

BLASTING BY GALVANISM.

To the Editor of the "Inventors' Advocate."

SIR,—Being convinced it is your aim to sustain with impartiality the character of advocate of inventors' claims and interest, I address you on the subject of two articles that appeared in your journal of the 9th inst., detailing two inventions in electrical science, of great importance to the practical miner, and in which my just claims to the credit of those inventions are not allowed me.

The first article is on a mode of assaying by electro-chemical action, and there stated to be the invention of Mr. Byers. It is apparently copied from the *Mining Journal;* but in that journal Mr. Byers acknowledges having received the first idea of this process some years ago from me; this acknowledgment has, however, been omitted in your periodical; and I must also in justice to myself say that not only did Mr. Byers receive the first idea from me, but a full explanation of the whole process, together with some essential details, that he has omitted in his communication. It is now some years since I first made the invention public, perhaps not so generally as I ought to have done; but the records of the Royal Geological Society of Cornwall will show my having read a paper on this subject during the presidency of the late Mr. Davis Gilbert.

May I, in the next place be allowed to state that in the second article to which I allude, "blasting by galvanism," there appears a doubt as to priority of claim to the invention between Col. Pasley and myself. In the records I before mentioned it will be found, that I read a paper, and exhibited experiments on this mode of blasting, at a meeting of the Royal Geological Society of Cornwall, many months before Col. Pasley had made his experiments. A short account of my plan was also published in the Transactions of the Electrical Society of London, a considerable time before Col. Pasley made use of my process; and I also used my apparatus for blasting on a large scale, both in rocks, and under water, before we heard any thing of this gentleman's operations.

I trust these explanations will satisfy you of the justice of my claim to priority of invention in both the above instances.

My method of tamping with dry sand will be found one of great safety and efficacy: but a point perhaps not sufficiently insisted upon in your kind notice of my pamphlet is the necessity of allowing an empty space to exist in the bore hole, between the gun-powder and the wad of the tamping. When the space extends to 12 or 18 inches, and dry sand is poured over it to the depth of 12 or 15 inches, I may say that no charge of powder, however great, would blow the tamping out, unless the rock be absolutely unrendable. An analogous case is the bursting of a musket, if fired when the ball is rammed but a short way down the barrel. Most persons conversant with the use of fire-arms know how difficult, indeed, impossible it is, to blow out a musket ball under these circumstances, as the barrel generally bursts. It might be tedious to enter into an explanation of the cause of the phenomenon—suffice it to say, the fact has been proved by me in very many experiments, and my method of tamping is so safe and efficient, I feel assured the life of many a miner would be saved by its adoption.

I have the honor to remain, Sir,
Your obedient servant,
MARTYN W. ROBERTS, F.R.S., Edin.
Gothic-cottage, Beulah-spa, Norwood,
12th January, 1841.

ON THE SPIRITUAL LIFE OF PLANTS.

The views entertained by the renowned botanist, Dr. C. F. P. Von Martius, of Munich, on the soul of plants, are thus recorded by the late Professor Meyen, in his " Report on the Progress of Vegetable Physiology," for the year 1837.*

It appears, observes M. Von Martius, as if natural philosophers were in general not inclined to admit, in the essence of the plant, these two spheres,—body and soul, as if they would concede a soul only to animals and man. It is usual to regard, as the essential predicate of the soul, perception, such as it appears in animal life; and, as in the vegetable kingdom, we are acquainted with very few phenomena which admit of our concluding upon a power of perception in plants, they have been declared not to possess a soul. Von Martius points out, that even animal form sinks so low in the scale of organisation, that all the characteristics of animal life disappear in them; on the other hand, indications of vegetable life display themselves: whilst in the more highly developed vegetable forms, phenomena occur which belong to animal life, such, for instance, as the manifold various motions which have been observed in plants; in fact, that animal life and vegetable life appear in no way to be so decidedly separated from each other, and for that reason, therefore, a soul cannot be admitted in animals alone and denied in vegetables. Even the predominant growth and the propagation of plants appear to indicate that they are not confined to the circle of rigid necessity; and we must recognise in them a kind of predetermination, a tendency to the ideal, consequently a higher vital principle—a soul. The soul of plants is much less complex than that of animals; it is in fact, in itself, of a more obscure and undefined nature. Perception, imagination, consciousness, sensation, desire, volition, appear here to have sunk into the night of a gloomy confined existence, and the narrow path of analogy and induction towards this subject, unattainable by our inquiries, is open to us but for a short distance. The *vegetable soul* must not, however, be compared with the soul of *man*, or with that of the *higher animals*, but rather with the *nucleus*, or that point of the axis only, around which the life of the *lowest and most simple animals* revolves.

Von Martius thinks that we can admit of no organ of soul in plants; yet we may probably succeed, as I think, in our time, in discovering this organ even in plants; the nervous system has, as is well known, been already observed in vegetables by some learned botanists; although others, it is true, have not been able to convince themselves of the fact.

A series of phenomena are moreover enumerated, such as the specific susceptibility of plants for the actions of light, heat, air, moisture, &c., which, without a certain degree of sympathy and perception, could not possibly have effect. Perhaps in them all the various grades of spiritual action combine to produce one single obscure idea. The more general and intense the irritation which acts upon plants, the more powerful is the perception. The sleeping and waking of plants, as also their hybernation, correspond exactly to the similar phenomena in animals, only that these states in plants are involuntary. The soul of the plant is diffused throughout it; in so far however as the vegetable soul acts according to its nature formatively, plastically, one might say that it is situated in the more highly organised plants, principally in the node, in which the vegetable powers slumber.

This latter opinion might, however, be disputed, as might generally the entire current doctrine of the composition of plants of internodes. With respect to the rest I agree perfectly with M. Von Martius; nay, it is to me inconceivable how all those phenomena of the *vita sensitiva* of plants can be thought to be explained by the indefinite expression of irritability.

Von Martius next enumerates the other manifold processes, which the vegetable soul has to superintend when the plant is propagating by sexual intercourse, and concludes these observations with the following words: " Among intricate perceptions and ideas, a dark sensibility, a consciousness, a sympathy, a stimulus, an increase of this to affection, probably also a kind of memory in the repetition of certain physical actions;—all this we may deduce from the various habits of plants, if we compare them with analogous relations in animal life. We are not, however, able to trace in them a higher sense, understanding, or free will."

* Abstracted from Mr. W. Francis' Translation, 1839.

THE FORMER EXISTENCE OF GLACIERS IN SCOTLAND.

The late visit of M. Agassiz to Scotland, during the meeting of the British Association, seems to have set all our geologists off, upon a new scent—glacier hunting. That distinguished zoologist and geologist, by his interesting work and illustrations on the Glaciers of Switzerland, has, we think, proved that they formerly existed at a much lower level than they do now on the Alps of the continent; and anxiety to examine a country where glaciers no longer existed was the immediate motive of his visit to Scotland during the last autumn. In company with accomplished English and Scotch geologists, the examination was accordingly made, and the same appearances which characterise the rocks under the European glaciers being observed in various parts of the higher mountain ranges of Scotland, induced M. Agassiz to believe that they formerly existed in these mist-clad regions, and that many of the phenomena attributed to the action of water, such as the parallel roads of Glenray, &c. were caused by their influence; and he writes thus on the subject to Professor Jameson:—

" After having obtained in Switzerland the most conclusive proofs that at a former period the glaciers were of much greater extent than at present; nay, that they had covered the whole country, and had transported the erratic blocks to the places where these are now found, it was my wish to examine a country where glaciers are no longer met with, but in which they might formerly have existed. I therefore directed my attention to Scotland, and had scarcely arrived at Glasgow, when I found remote traces of the action of glaciers; and the nearer I approached the high mountain chains, these became more distinct, until, at the foot of Ben Nevis, and in the principal valleys, I discovered the most distinct *moraines* and polished rocky surfaces, just as in the valleys of the Swiss Alps, in the region of existing glaciers; so that the existence of glaciers in Scotland at early periods can no longer be doubted. The parallel roads of Glen Roy are intimately connected with this former occurrence of glaciers, and have been caused by a glacier from Ben Nevis. The phenomenon must have been precisely analogous to the glacier lakes of the Tyrol, and to the event that took place in the valley of Bagne."—*Ann. Nat. Hist. Jan.* 1841.

SCIENTIFIC MEMORANDA,

AND

NOTES ON ART.

Ratios of Iodine in British Sea-weeds.—The following table showing the proportion of iodine yielded by some of the most common sea-weeds of our coast, has been drawn up by Mr. Whitelaw, an iodine manufacturer in Glasgow.

		Ratios of Iodine.
Laminaria	digitata	100
,,	bulbosa	65
,,	saccharina . . .	35
Fucus	serratus	20
,,	nodosus	15

The quantities of chloride of potassium were nearly in the same ratio.

Granites of different ages.—It was formerly supposed that granite was the oldest of rocks, the mineral product of a particular period or state of the earth, formed long antecedently to the introduction of organic beings into our planet. But it is now ascertained that this rock has been produced again and again, at successive eras, with the same characters, penetrating the stratified rocks in different regions, but not always associated with strata of the same age. Nor are organic remains always entirely wanting in the formations invaded by granite, although they are usually absent. —*Lyell's Geology.*

British Association.—At a meeting of the council held last week in London, it was finally determined that the meeting of this body which is to take place at Plymouth the next summer, shall commence on Monday the 12th of July, and terminate on Saturday the 17th of July, and the council will meet on Saturday the 10th of July to make the necessary arrangements.

Iceland Moss—Is imported in bags and barrels from Hamburgh and Gothenburgh, and is said to be the produce of Norway and Iceland. In 1836, 20,599 lbs. paid duty; in 1837, 12,845 lbs.; and in 1838 only 5,179 lbs. In Carniola, pigs, horses, and oxen are fattened by it. Its effects on man is simply that of a mucilaginous or demulcent tonic, without any trace of astringency. If the bitter matter (*cetrarin*) and extractive be removed, it is nutritive, emollient, and demulcent, like ordinary starch, over which it has no advantage. Captain Sir J. Franklin and his companions tried it as an article of food, when suffering great privations in America, but its bitterness rendered it hardly eatable.—*Pereira's Materia Medica, Part II.*

Value of Mining Property in Scotland.—We understand that no less than £60,000, cash down, has been paid for the iron stone, only of 70 acres of land, on an estate in the neighbourhood of Airdrie. The coal on the same land, in addition to this, is also of great value.—*Glasgow Chronicle.*

Accident from the Compression of Carbonic Acid.—The following melancholy accident occurred on Wednesday week at the Ecole de Pharmacie, in the Rue de l'Arbalète, Paris:—Two of the assistants of M. Bussy, aided by M. Thilorier, had been compressing carbonic acid gas, according to the process of M. Thilorier, and the experiment was to have been repeated in public in the theatre of chemistry by M. Bussy. The cylinder in which the gas had been compressed, to the extent of 130 atmospheres, was of cast-iron, nearly two inches thick, and of a capacity of only three quarts. The experiment having been completed, M. Thilorier went into another room, but the two assistants remained. Suddenly the cylinder exploded with a terrific report, and, bursting into several fragments, destroyed everything in the laboratory. One of the assistants was driven with such force against the wall, that he broke the door and shelves of a cupboard, and had both legs dreadfully mutilated. The other assistant was taken up senseless, but was not severely injured. The force of the explosion was so great, that portions of the cylinder entered the wall to a great depth, and some iron instruments, which were lying near it, were driven into the brick flooring. The assistant who was so much injured underwent amputation of one leg, and has since died. Two days previously to this accident, the same experiment was performed by M. Orfila, in the theatre of the Ecole de Medicine, in the presence of 1,200 persons; and it was also performed during the week at the lecture of the Sarbonne, which was quite as numerously attended.

Constituents of Wine.—Alcohol, an odorous principle, (*volatile oil?*) blue coloring of the husk (*in red wine*); tannin, bitter, extractive, sugar, (*especially in sweet wines*), gum, yeast, acetic acid (from the commencement of the acetous fermentation), malic acid, tartaric acid, bitartrate of potass, bitartrate of lime, sulphates and chlorides, phosphate of lime, carbonic acid (especially in the effervescing wines), and water. *Bouquet of Wine; odoriferous principle of Wine.*—Every wine has a peculiar odor, which depends doubtless on a small quantity of volatile oil. The oily liquid obtained by Liebeg, on distilling wine, is *œnanthic ether* mixed with œnanthic acid.—*Pereira's Materia Medica, Part II.*

Spontaneous Gas Lighting—The project of applying gas in its natural state as generated in the coal mines to the purpose of giving light, has within the last few days been brought into partial operation. The gas has been brought from the Walls-end pit in pipes to the Newcastle and North Shields railway. Some lamps are lighted with it nightly at the sides of the railway near Carville, and in the station-house there. The light may possibly answer the purpose to which it is applied—that of illuminating the railway even for its entire length, as well as all the stations; but it is by no means to be compared in brilliancy with the gas supplied in Newcastle and the surrounding towns. The experiment, it is but fair to admit, is only yet in its infancy; but before the gas drawn from coal mines can in our opinion be applied in the manner contemplated by the projector—namely, to the public and private lights of the towns of Newcastle, Shields, and Sunderland, two important points must be compassed. First, the enormous quantity of gas nightly required must be permanently secured, which we believe to be impracticable; and secondly, it must be purified as it is at present by the gas companies, which of course is quite possible, but would be nugatory if the great essential of certain and almost unlimited quantity cannot be obtained.—*Tyne Mercury.*

Aurora Borealis.—Never was there a more beautiful display of this interesting visitation than was apparent on the evening of Monday last at Ripon. The appearance of the heavens was grand in the extreme: vivid pillars of light of the most brilliant description were concentrated in the direction of the zenith, in various and varied streams. The phenomenon was but of short duration, and might not be prevalent more than a quarter of an hour in its greatest beauty, but during that time (between half-past eight and a quarter to nine) the scene was magnificent in splendor. After that period lucid rays became diffused, and presented a broad, and, towards the north, a universal sheet of light, which then gradually waned until the heavens resumed their wonted aspect in a clear and starlight evening.—*Leeds Intelligencer.*

Daguerreotype Paintings.—Improvements on the new art invented by M. Daguerre are in progress. M. Grehoff, of Moscow, has written to the Academy of Sciences in Paris

that he has succeeded in rendering Daguerreotype drawings neffaceable, and sent plates possessing this property. He has succeeded in obtaining drawings on copper and brass plates, and announces that he can transfer an engraved plate on copper, and engrave it afterwards, whether in relief or in taglio. M. Hubert, architect, has also presented the Academy with plates prepared according to the method of M. Fizeau, with chloride of gold, in order to give more tone to the drawing. He is now applying this process to old plates as well as to the most recent. By a process, which he has not yet communicated, he has succeeded in coloring these plates, and has already obtained white, blue, and yellow colors.

Improvement of the Daguerreotype.—Hitherto it has been found impossible for the Daguerreotype to fix the impression of any moving object, such as the clouds, the sails of a vessel, &c. M. Daguerre, however, has authorised M. Arago to announce to the Academie des Sciences, that he has succeeded in overcoming this grear difficulty, and has discovered the means of catching a complete image of any moving object in less than a second.—*Galignani.*

The Temperature.—On Saturday morning last week, the thermometer indicated in the Regent's Park the zero of Fahrenheit, or 32 deg. below freezing point; and on the previous evening at St. John's Wood, it was observed 2 deg. lower. This is the lowest degree of cold that has been experienced in this country for many years. The coldest year on record was 1780, when Fahrenheit's thermometer at Glasgow was at 14 deg. below zero, and when placed in the snow was observed as low as 33 deg. below zero.

Caution as to Stove Pipes.—A few days ago a fire occurred at Thrapston, Northamptonshire, occasioned by a piece of lighted paper being carried up the pipe of a stove, and falling down the flue of a bed-room chimney into which the pipe was conducted, setting fire to a papered screen before the grate. Happily the damage was confined to the bedstead and furniture, but the occurrence may explain the origin of many fires hitherto unaccounted for.—*Leicestershire Mercury.*

Weather Table.—The following table (ascribed to Dr. Herschel, and revised by Dr. Adam Clarke), constructed upon philosophical considerations of the attraction of the sun and moon, in their several positions respecting the earth, and confirmed by experience of many years' actual observations, furnishes the observer, without further trouble, with the knowledge of what kind of weather there is the greatest probability of succeeding, and that so near the truth that in very few instances it will be found to fail.

New and Full Moon.	*Summer.*	*Winter.*
If it be new or full Moon, or the Moon entering into the first or last quarter at 12 noon, or between 12 and 2	Very rainy	Snow and rain.
2 and 4 aftern...	Changeable	Fair and mild.
4 and 6 evening	Fair	Fair.
6 and 8	Fair, if wind at N.W. Rainy, if wind at S. or S. W.	Fair and frosty if wind at N. or N.E. Rain or snow if S. or S.W.
8 and 10	Ditto	Ditto
10 and 12 night	Fair	Fair and frosty.
12 and 2 morning	Ditto	Hard frost, unless wind S. or S. W.
2 and 4	Cold, with frequent Showers	Snow and stormy.
4 and 6	Rain	Ditto.
6 and 8	Wind and Rain	Stormy weather.
8 and 10	Changeable	Cold rain, if wind be W.: suow, if E.
10 and 12 noon	Frequent showers	Cold with high wind.

OBSERVATIONS, BY DR. KIRWAN.

When there has been no particular storm about the time of the spring equinox (March 21), if a storm arise from the east on or before that day, or if a storm from any point of the compass arise near a week after the equinox, then in either of these cases the succeeding summer is generally dry, four times in five. But if a storm arise from the S.W. or W.S.W. on or just before the spring equinox, then the summer following is generally wet, five times in six.

VARIETIES.

Catastrophe in a Coal Mine.—We regret to state that another of these shocking calamities, to which mining districts are so unfortunately subject, has just occurred in the neighbourhood of Bolton. It appears that on Monday morning last the gas, in a mine at Aspull Moor, known by the name of the "fire-damp," a short distance from that town, from some cause which we have not heard, became ignited, and exploded with tremendous violence. No less than four workmen fell immediate victims to the accident three of them having been brought out of the pit soon after the occurrence in a lifeless state, and a foorth found, also dead, some time after. Two other men were also dreadfully burnt, but are expected to recover. The names of the deceased miners are James Prescott, John Brown, James Brown, and David Tinsley.—*Manchester Chronicle.*

Suffocation by Gas.—The *Courier* of Strasburg gives the following account of an occurrence, which, it states, has thrown the whole town into alarm:—"About 10 o'clock on Saturday morning, M. Horst, a teacher of the piano, uneasy at finding that the house in which he lived was infected with a strong smell of gas, sent for the chief agent of the company to ascertain the cause. They began by examining the ground floor, and on coming to the kitchen of an apartment occupied by the family of M. Beringer, a dealer in glass and other articles from the Black Forest, stifled groans and other sounds of a dying person were heard from the adjoining room. M. Horst had the room, whence the ominous sounds issued, forced open. It was in darkness, the shutters being still closed. When light was admitted, six persons were lying in different positions, either dead or in the last agonies. M. Beringer was lying in the middle of the chamber, with his face to the ground, entirely dressed, except his coat and waistcoat Near him, and in front of a stove, lay the servant, a young woman, completely clothed. The wife, who was also dressed, was lying on her bed, with the youngest child, a little girl seven years old. On a mattress, near the window, was one of the two sons, 15 years of age, with his drawers and waistcoat on, and near him, on the floor, his brother in his shirt. All were foaming at the mouth, had their features contracted and of a violet color, and their limbs distorted and stiff, as if they had been suffering from violent convulsions. Not one of them showed any signs of life except the father, the rattling in whose throat had given the alarm. Medical assistance was given, but all were dead except the father and mother. It was afterwards found that a considerable issue of gas had taken place from the pipes into the house, and had, no doubt, caused the accident. In the evening M. Beringer was still alive, but was not expected to survive. His wife remained in a state of delirium."

Explosion of Fire Damp.—On Monday, last week, an explosion of fire-damp took place in a cannel pit belonging to Mr. John Johnson, at Aspull Moor, by which four persons lost their lives, and two others were severely, but we believe not dangerously injured. It appeared that one of the deceased was what is called the foreman of the pit; whose duty it is to go through the workings the first thing to see that they are safe. He proceeded with a safety lamp, but some others followed him, one of whom had a lighted candle. The force of the explosion, rather than the burning or suffocation, caused the death of each of the men. The jury returned a verdict that "the deceased were *accidentally* (!) killed by an explosion of fire damp."

Spanish Steam Boats.—A letter from St. Sebastian says, that the Spanish Regency intend to build at Passages six steamers of 400 horse-power each.

Skating on Shore.—We perceive by the *Liverpool Mercury* that a Mr. Dolier, of that town, has proposed a plan for enabling persons who delight in skating to enjoy the amusement on dry land.—The Editor of the *Mercury* observes that M. Dolier "speaks most confidently of the result of an experimental specimen which was, as he states, highly approved of by two or three skaters, to whom he showed it in confidence. However the substitute for skating may turn out, we have long been convinced that nothing would he more simple than to construct a fine long sliding slip, on which youth might in perfection enjoy the amusement called sliding, at all times, and in the highest perfection."

Ergot in Wheat.—At a late Meeting of the Cambridge Philosophical Society, Professor Henslow brought under the notice of the meeting the prevalence of *Ergot in Wheat* in that part of Suffolk in which he resides; and he expressed it to be his opinion that the presence of *Ergot* in the flour, might be the cause of many of the grievous sores to which the poor are liable.

Power of Steam.—A pint of water converted into 216 gallons of steam will raise thirty-seven tons a foot high; and if the steam is allowed to expand to double that volume, twice that weight. The greatest load ever lifted by any steam-engine in England was by one in the Consolidated Mines, in Cornwall, on the expansion principle, which raised a load of 90,000 lbs. 7 ft. 6 in. high every double stroke it made, and this nine times a minute.—*Mechanics' Almanack.*

Blast in Iron-smelting Furnaces.—The blast in iron-smelting furnaces was originally produced by means of bellows; and so strong was the prejudice in favour of this method, that when the iron cylinders were first proposed, it was with the greatest difficulty they obtained a trial; nor was it till after the lapse of several years that the "stubborn fact" of their producing twice the quantity of iron which had been ever reached hy the old bellows, led to their universal adoption. The Tintern Abbey Works were the first at which cylinders were employed. The density of the blast furnished hy the bellows rarely exceeded one pound on the square inch, but the increase through the employment of the cylinders is in some instances fourfold, and on the average more than double.—*Mechanics' Almanack.*

Coal Mines in Spain.—We find hy the Spanish journals that the rich coal mines at Sama, in the Asturias, are beginning to be worked on a large scale, and that the railway from them to the small port of Gijon affords the produce a ready entrance into the Bay of Biscay. Several shafts have been opened, and traverse 11 beds of coal, said to be equal in quality to the best Newcastle, and of an inexhaustible abundance. The railroad runs through a mountainous country, but the inclination of its planes does not exceed 5 in 100. These mines will form the groundwork of a brisk trade with Bayonne, Bordeaux, and the whole of the basin of the Garonne, where hitherto all the coal used has been drawn from England or Belgium.—*Galignani's Messenger.*

Electrotype.—M. Kobell, of Munich, presented some engravings through M. Brongniart to the French Academy, which were produced by a modified process of his own. Upon a well polished plate of copper or silver, he executes a painting of the subject to be engraved. The color which he employs is oxide of iron, pounded with essence of turpentine, and mixed with a certain quantity of the same essence thickened by standing, or, what is equally good, with a solution of the resin of Dammera, in the essence of turpentine; he sometimes adds formate of silver. This painting is obviously monochromous, and the variety of tints is produced by the different thicknesses of the color applied upon the plate of silver; so that the lights are given by the metallic surface, and the half tints and the shades by the greater or less thickness of the color. When the painting is well dried, and adherent to the plate, it is to be deposited in an electrotype apparatus in order to receive the deposit of copper, which takes place immediately upon the parts not covered by the painting, more slowly upon those which are only covered by a thin layer, and more tardily still upon those parts where the thickness is greatest. After several successive applications, when the thickness is sufficient to support the action of the copper-plate press, the deposit is to be separated from the plate, and the former, if any remain adherent, may be disengaged from the painting, by washing with ether; we have then a mould of the painting, executed in relief upon the silver plate: and we may conceive that if we take an impression by the ordinary copper-plate press, the color deposited upon the paper will possess the thickness of the original painting, which will be faithfully reproduced.

Anhydrous Silicate of Iron.—M. Fellenberg lately analysed this mineral from the Azores, and found its composition, silica 31, protoxide of iron 62.5. The same mineral was discovered several years before by Dr. T. Thompson, and its composition found to be, silica 29.6. protoxide of iron 68.73. The latter specimen was obtained from the Mourne Mountains, Ireland.

On the Constitution of the Atmosphere.—Dr. Dalton is of opinion (after having chemically investigated the relative proportions of oxygen and nitrogen gases of which the atmosphere is composed, from all elevations in this country, Switzerland, &c.,) that the proportion of oxygen to azote (nitrogen) in the atmosphere on the surface of the earth is *not* precisely the same at all places and times; and that in elevated regions the proportion of oxygen to azote is somewhat less than at the surface of the earth, but not nearly so much so as the theory of mixed gases would require; and that the reason for this last must be found in the incessant agitation of the atmosphere from winds and other causes.—*Philosophical Magazine,* 1838.

Survey of Portsmouth Harbour.—A most complete survey of the Portsmouth harbour, with its various lakes and approaches, has recently been made by Lieutenants Sherringham and Otter, and their assistants, including a minute map of the towns. The most extraordinary coincidence exists, we understand, hetween the present survey, with all the improved methods, and still more improved instruments, and the old survey of Mackenzie, made in 1782, and the still more recent one of the late talented and industrious Mr. Park, who was then master attendant here; and, still more extraordinary, the soundings all over have varied only in the slightest degree in the period alluded to, sixty years. The bar of the Southsea Landmarks remained unaltered from its shape and size as recorded in the oldest minutes; and we find it consists of no shifting matter, but is a firm substance of flint and chalk, almost concreted together with gravel; it could he channelled with much ease, but with ome expense.—*Hampshire Telegraph.*

Censorship in Austria and Russia.—Not a single book appears at Vienna, whether foreign or domestic, without undergoing the censorship—not a single line is printed there that has not previously been weighed maturely by the officers thereto appointed. Some alleviations of this have lately been made, but in point of fact nothing of importance has been done. At Berlin the censorship appears to be exercised more strictly than ever. By a new regulation, for books in each particular branch of science, persons acquainted with that branch are appointed as censors—thus medical men, medical works; lawyers, legal works, &c.; while the police have to superintend the lighter works, newspapers, periodicals, &c.

Wood Paving.—Mr. Stead, the patentee of one of the numerous kinds of wood paving, considers himself aggrieved by a paragraph which appeared in the papers last week, and which we copied from the *Times*, representing or insinuating that all other wood paving had failed but that of the Metropolitan Company, as exhibited in their specimen at Whitehall. Mr. Stead has published a letter in reply, which appears in the *Times* as an advertisement, wherein he says:—"The pavement at St. Giles's church is particularly specified as having broke up, and with it all my specimens are artfully included, as if they, too. had done so. The pavement so mentioned was not laid down by me, and it was constructed in direct opposition to my advice. I am, therefore, in no way answerable for its defects, whatever they may be; but, as regards the other specimens in Oxford-street, Lamb's Conduit-place, Berkeley-square, at Sion-house, and in the Old Bailey, the insinuation that they have broken up is quite false; there is neither unevenness of the surface, nor are they less firm than when first laid down, some of them more than two years ago, and have been during the entire period of severe weather remarkably free from slipperiness—quite so, indeed, except for about a couple of hours, during the sudden

transition fiom thaw to frost last week. With regard to the Whitehall specimen, which, it is asserted, has been free from this defect, I have no hesitation in stating that it has been more slippery during the frost than any other level pavement in the metropolis; and that, too, notwithstanding the care that has been taken to keep it clear of snow and ice, by means of laborers hired for the purpose; and, moreover, to spread sand and gravel upon it to make the passage safe."

Shawl for the Queen worked by the Blind.—Her Majesty has been pleased to accept the shawl worked by the inmates of the Victoria Asylum for the Blind at Newcastle, and has given directions that it be immediately forwarded for presentation to Her Majesty.—*Newcastle Journal.*

Inoculation Experiment—We feel much pleasure in laying before our readers some particulars of an experiment recently made by Mr. Badcock, chemist, of St. James's-street. Mr. Badcock has inoculated a fine young cow of his own with small pox; with the lymph from the animal he has vaccinated his own child; and from that child he is now supplying the medical men of Brighton with pure fresh lymph, such as was used formerly by the justly celebrated Dr. Jenner.—*Brighton Gazette.*

Perilous Feat.—The Hon. C. G. Noel, M.P., and his brother, the Hon. H. Noel, drove their gig on Monday last twice across the lake in Exton Park, which is in many places more than twenty feet deep. The thickness of the ice was not more than five inches.

Post-office Money Orders.—It is not generally known that the Post-office will pay money orders through a banker. We hear that the increase of money orders since the reduction of the fees in November last, in London is about three-fold.—*Times.*

ADVERTISEMENTS.

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THE
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THE ACTION OF GUNPOWDER IN BLASTING.

The curious fact announced by Mr. Roberts in his description of his new mode of blasting by galvanism, which was noticed in the two last numbers of our Journal, deserves to be considered more at length, and to have its cause explained. The fact to which we allude is, that loose dry sand put into the bore-hole of a blast will be sufficient to withstand the explosive force of the gunpowder, *provided there is a vacant space left between the wadding and the powder*; and that the hardest rocks will be rent asunder before the loose sand will be blown out of the hole. The bursting of a gun, when the ball is rammed only a short way down the barrel, is also mentioned as an analogous fact, depending on the same cause; though it does not seem so extraordinary as the rending asunder of hard rocks before loose sand gives way. We propose to examine the nature of the phenomenon, and to explain its cause.

It must be borne in mind, that it is one of the essential properties of all forces emanating from a centre to diminish in power in proportion to the squares of the distance from the acting point. The rationale of this effect is, perhaps, more clearly exhibited in the diffusion of light, than in any other central emanations.

The flame of a candle sends out rays of light in all directions, in straight lines; consequently, the farther the rays extend, the light becomes diffused over a larger space, and its intensity is diminished in exact proportion to the increase of surface which it illuminates. If a piece of board, one inch square, be held at a distance of one foot from the flame, it receives all the light which would be diffused over four square inches at a distance of two feet; or over sixteen square inches, at a distance of four feet. The quantity of light is the same in both cases, but its intensity varies, it will be seen, as the square of the distance. What is thus apparent in the diffusion of light takes place equally in all radiating powers—gravitation, cohesion, explosions, heat, sound, &c.

We may thus easily comprehend that when an explosion of gunpowder takes place, the force exerted on bodies nearly in contact with the centre of explosion is four times the amount of that which operates at twice the distance, and sixteen times as great as is exerted at four times the distance. It will also be observed, that in proportion to the closeness of approach to the centre whence the explosive force emanates, will be the amount of power exerted on a given surface, and that a smaller increase of distance will produce a greater difference in the effect. For instance, suppose a ball were rammed into a gun to within the tenth part of an inch from the centre of explosion, the force exerted in expelling it would be, according to theory, four times as great as if the ball were at a distance of two tenths of an inch from the central force. Thus the difference of one-tenth of an inch would produce a quadruple diminution of power. But when we commence with the ball at a further distance from the centre of explosion, say half an inch, it would then require a distance of another half inch, instead of a tenth, to produce a quadruple diminution of power. This is not however absolutely the case in practice, for the explosive force does not emanate from a point; but from the whole mass of powder employed, acting from the centre outwards. Though the distances we have assumed may not, therefore, be correct in practice, nor applicable to a ball rammed close to the powder, yet they will be found correct at greater distances, compared with which the quantity of powder exploded may be considered as a point.

Having thus re-stated the action of central forces, to make the subject intelligible to those of our readers who may not have attended to it; the application of this action to the explanation of the phenomenon in question, may be readily understood.

When a ball is rammed down into a musket barrel close to the powder, the explosive force of the gunpowder acts on it with full effect; and it is expelled, with accelerating speed, out of the barrel. The gases generated in the explosion thus obtain room for their expansion. But if the ball be rammed down only part of the way, the sudden explosion will not act with sufficient power on the ball to expel it; and the expansive force of the powder confined within the breech of the gun, causes it to burst.

Assuming, for instance, that the ball when rammed down to the powder, is still half an inch from the centre of explosion, and that when partly rammed down it is twenty inches from the same centre; in the latter case the force acting on the ball would be sixteen hundred times less than if the explosion were to take place when it is close to the powder. Supposing the ball to be one-tenth of an inch from the centre of explosion when rammed down close, the difference in the sudden explosive effect would be increased to 40,000. The same principle may be explained by drawing numerous radii from the supposed centre of action in the powder in all directions round it. The number of radii touching on any point may be taken as signs of the comparative amounts of force exerted. It will then be found that the number of radii which reach the ball when at a distance from the powder bear about the same proportion to those touching it when close, that we have indicated as the amount of the respective forces acting upon it. When the ball is more distant, the radii, which before touched it, strike against the inside of the barrel. Thus we perceive that when the ball is not rammed down, there is a large additional portion of the gun-barrel exposed to the sudden explosive force of the powder, tending to burst it asunder in its weaker parts.

In the foregoing instances ignited gunpowder is considered only as a central force; and in this respect its sudden explosive action, which produces its general effects, may be regarded. But if the resistance it meets with be too great to be overcome, the compressed gases produced from its ignition will act otherwise than as central forces, and will press equally on every part of the internal surface.

The circumstances we have stated in reference to the explosion of gunpowder in a musket will equally apply to the process of blasting; and will show the cause why a force which is able to rend the hardest rocks is unable to blow out a few inches of loose sand. In consequence of the space left between the wadding and the powder, the amount of the explosive force that is brought to bear on the surface of the wadding is extremely small compared with its action on the rock immediately surrounding the powder. A mass of twelve or fifteen inches of dry sand, Mr. Roberts states, is sufficient to confine the effects of the largest charge of powder, unless the rock be absolutely unrendable.* There is another advantage attending this mode of blasting which Mr. Roberts has not pointed out, but which may be perceived

* When the rock resists the sudden shock, then the compressed gases act equally on all parts of the bore, and there is no advantage gained by leaving the vacant space.

from the preceding consideration of the bursting of a gun-barrel. When the tamping is driven close to the powder, a part of the rock is protected from the action of its explosive force by the tamping itself. When there is a vacant space left, a larger portion of rock is exposed to receive the effects of the explosion, part of which, in the usual method of proceeding, is uselessly exerted against the tamping, tending to force it out.

There is no necessity for restricting Mr. Roberts's improved mode of tamping to his method of exploding the powder by galvanism. The latter mode, though in all respects a great improvement in the use of tho fuse, requires some arrangements and manipulations, which at present, at least, the miners may not be found willing to adopt, or always capable to execute; but the new plan of tamping presents such manifest advantage—is so great a saving of trouble as well as a great avoidance of danger,—that we cannot imagine any one would hesitate to adopt it. We are, therefore, anxious to separate the two plans, for the purpose of inducing the more general introduction of that one which from its simplicity, as well as its efficacy, is calculated to confer immediate benefits on all miners.

CHEMICAL ACTION OF LIGHT.

At the meeting of the French Academy of Sciences on the 11th inst., M. Biot made a report of the researches of M. Edmund Becquerell, on the chemical action of the rays of solar light.

Certain substances, as is well known, have the property of being modified in their characters and in their internal composition by the action of light. It is on this fact that the chief operation of the Daguerreotype depends. For instance, the slight coating of iodine with which the silvered plate is covered by exposing it to the vapor of iodine, is modified by the light from the objects concentrated in the camera obscura; and the force of this action is proportioned to the intensity of the luminous rays. Is it the light itself—merely as light—which produces this effect? which thus blackens, for example, paper impregnated with chloride of silver? It has been shown that it is not, by causing the light to pass through a substance perfectly transparent, which does not obstruct its passage in the least nor diminish its brightness, and which, nevertheless, becomes thus deprived of its chemical properties. These properties are thus removed by the light traversing through certain diaphanous substances, which allow the light itself to pass, stopping only in its progress the chemical rays. On the other hand, the brightness of the light may be diminished without in any way affecting its chemical properties; which effect takes place when the rays pass through blue glass. Thus it appears, that the rays which are emitted from the sun consist of two kinds, of very contrary qualities, acting generally together, but which may be separated by some of the means already indicated. These are, the luminous rays, properly so called, and the rays which are invisible, but are appreciable by their effects, which have been called chemical rays, for the want of a better term.

The attention of M. Becquerell has been directed especially to the consideration of the latter rays. This young and skilful philosopher has discovered a remarkable circumstance regarding these rays and their effects on substances sensible to their action. A piece of paper impregnated with one of these substances may be exposed in a camera obscura to the different rays of solar light, decomposed by the prism, without undergoing any change; whilst if the paper be previously exposed to daylight, for as short a time as possible—for the space of a second or of half a second—the action of the light so weakly commenced and scarcely perceptible, will be continued in the solar spectrum in such a manner that soon all parts of the paper which had previously been exposed to day-light will change from white to black, according as they are exposed to the rays of the prism; whilst the same paper, if kept in a dark place after its momentary exposure to the light, will preserve its white color almost entire. Thus we perceive, in the one case, no action from the rays of the spectrum on the sensitive paper which has not been previously exposed to the light; and in the other, in the contrary, the continuation of that action on the rays of the spectrum, when it has only been just commenced by the solar light. This is one of the principal results from the experiments of M. Becquerell; and in this, perhaps, consists the secret of the new modification announced by M. Arago, in the photogenic process of M. Daguerre, which enables it to produce images by exposing the prepared plate for a second only in the camera obscura.

It may, in fact, be conceived, having seen the memoir of M. Becquerell, that the plate coated with iodine might, after having received the impression of the object for only a second, be exposed to the rays of the solar spectrum in which the action—commenced by the luminous rays from external objects—might be completed, as in the experiment of M. Becquerell; so as to enable the mercurial vapor to produce the effect which it is known to do in the ordinary process of Daguerreotype, and render the image visible.

All these discoveries and modifications originate from the fundamental fact on which the two principal operations of the Daguerreotype depend; from which we learn that a substance may be modified by light, without any change being perceived by the eye, in such a manner that an image may be produced, invisible at first, which becomes visible by the action of another agent. This effect is produced by the vapor of mercury; which attaches itself to those parts of the coating of iodide of silver which are more or less affected by the luminous rays. This important fact, discovered by M. Niepce, will, we have no doubt, be applied in other methods, and be productive of further consequences.

BRITISH PATENTS.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLLMENT OFFICE.

(*Continued from page* 35.)

RICHARD PROSSER, of Birmingham, civil engineer, *improvements in manufacturing buttons from certain materials, which improvements in manufacturing are applicable in whole, or in part, to the production of knobs, rings, and other articles, from the same materials*, Dec. 17.—These improvements consist, first, in manufacturing the small articles beforementioned from materials used by the potter, and without the addition of water; and, secondly, in a peculiar form of button manufactured from the said materials.

Clay or clayey earths are reduced to powder, and then passed through a sieve having two thousand meshes to the square inch. After being passed through the sieve the powder is dried, if it be naturally too moist, and is then ready for the purpose of forming buttons or other small articles therefrom, which is accomplished as follows:

A fly press is fixed to a suitable frame; to this is adapted dies of the required form of the button, one of which is fixed to the follower of the press, and the other placed in the bolster. Into this the powder is placed until it is filled, when the follower of the press is brought down, with a force of 200 lbs. to the square inch, and the button formed between the two dies. The first part of the apparatus relates to an arrangement for removing the button from the mould. This consists of a treadle mounted on a fulcrum near its centre, and to the end of which a vertical rod is attached, which passes through the bolster and die, on pressure being applied to the end of the treadle, and raises the button out of the mould, which will then be found perfectly solid, and may be acted on in any of the usual methods of burning or glazing, &c. The peculiar form of button to which the second part of this specification refers is a brace button, with two holes instead of four, and with a groove running from one to the other, in which the thread will lie, and by which means they may be sewn on much stronger, and the thread is less likely to become cut or rubbed; they are to be put on with the groove in the surface of the button running in the same direction as the button hole.

Other methods are shown of forming different buttons and other small articles, and also various tools for forming the same. These consist generally of a similar construction as already described, only the faces of the tools vary to correspond with the pattern or form required. Bricks may be made in the same manner, and of any fanciful or ornamented form desired, with as much expedition as the common ones are at present made.

RICHARD PROSSER, of Birmingham, civil engineer, *improvements in apparatus for heating apartments and for cooking*, Dec. 17.—The apparatus for heating apartments consists of a new form of stove called the "Vesta Stove," being an improvement on that known as the "Chunk Stove." It consists of a fire pot enclosed in any casing, leaving a space between the two, in the lower and upper parts of which there are sand rings, for the purpose of preventing the entrance of any atmospheric air except at the proper point, and in the upper one of which the moveable top of the stove rests. The fire-pot is made of iron, and the mouth is closed by a sliding plate. Beneath the fire-pot are two reservoirs for the ashes; to the bottom one, iron rakes are fixed, the upper ends of which pass between the fire bars, and agitate the fuel, on a handle on the outside being pulled. This bottom of the receiver is a sliding plate, and also serves to regulate the draught. Atmospheric air is admitted by an aperture in the outer casing, below the fire bars. This aperture is capable of being closed to any degree, for the same purpose as the sliding bottom of the receivers. There is an opening in the upper part of the fire-pot, from which the smoke slightly descends, and passes through a long pipe into the chimney. The fuel is supplied to the fire-pot by a fuel hod, with a pail handle, and a moveable bottom. This being first filled with fuel, for which it must be turned bottom upwards, is placed over the top of the fire-pot in the stove, and the bottom slidden backwards, which action draws back the cover of the fire-pot, they being held together by a connecting piece, and the fuel is admitted without the escape of any smoke. Other modifications of stoves are shown, but the principle is the same, the object being to economise the heat carried away by the smoke, &c. The second part relates to an apparatus for cooking, and consists of a rectangular iron box with moveable fire-pots; the cover or top of the box becomes heated by the fire-pots inside, and thereby forms a hot plate on which the cooking is performed; at one end there is an opening, by which means roasting may be performed.

WILLIAM JEFFRIES, of Holme-street, Mile-end, metal refiner, *improvements in obtaining copper, spelter and other metals from ores*, Jan. 1, 1841.—Claim first. Mode of smelting copper ore, by treating the melted metal with carbon, or with alkali.

The whole of these improvements are confined to the smelting process. A suitable furnace is charged with ore in its raw state, by pressure. When this has become thoroughly melted, the mass is charged with either carbon, or alkali (carbon is best) in powder, and the charge continued until the mass again becomes melted, when the furnace is tapped, and it is run off into cold water, and then treated as usual.

Claim second.—Method of obtaining zinc from ore by means of ovens.

The ovens are made of any convenient form, and the heat applied from the outside; the roof, floor, &c. being as thin as possible consistently with strength. The bricks of three inches thick will be found suitable for the floor, and two inch bricks for the roof and sides. About 5 per cent. bituminous small coal is added to the ore, and the oven charged quite full. The door is then closed, and luted with fine luting. The heat of the furnace is raised; when distillation will ultimately be found to go on as well as when a number of small vessels are used, which has been the practice. Pipes lead from the upper and lower part of the furnace to reservoirs containing water, into which the metal is run when the progress is completed.

Louis Leconte, of Leicester-square, gentleman, *method of constructing fire-proof buildings*, Jan. 9.—Claim first.—Mode of constructing walls of buildings by frames of iron, filled with concrete.

The basement of the building is constructed in the usual manner, on which the fire-proof walls are raised. These consist of frames of cast iron, or cast iron and wrought iron plates combined. The corners are secured by means of pins fitting into each frame. For the doors, windows, and other apertures separate frames are to be cast. The required height of the building is obtained by placing one series of frames on another—melted lead being introduced between the joints in the ordinary way with iron work. The concrete consists of gravel and lime, and is poured in so as to fill up all the spaces in the frames, by which means the whole will be rendered firm and solid.

Claim second.—Mode of constructing beams of bent plates of iron.

These are made of plate iron, bent into an oval form, and strengthened by a bar of wood or iron passing through them, the upper edges being turned over to increase their strength.

Claim third.—Mode of constructing ceilings and plaster surfaces of wire-work, instead of laths.

There are iron rods fixed in the spaces between the beams, to which the wire fabric is fastened, and the whole plastered over in the ordinary manner.

George Barnett, of Jewin-street, London, tailor, *improvements in fastenings for wearing apparel*, Jan. 10.—Claim first.—The construction of spring hooks with shields. They are first cut into form from flat pieces of steel by means of a press and dies; leaving two points and two openings. They are then bent so that the openings form shields for the points after they have been turned up into hooks.

Claim second.—The application of a spring for fastening buttons with shanks.

These springs may be made of wire, or of a thin piece of metal, and are formed with projecting ends and an indented centre, so that on being passed through the shank they are fastened by the sides springing to when the shank has reached the indent in the centre.

Claim third.—Mode of constructing a spring hook for hooks and eyes.

These are made with the largest space at the end that is turned over, to allow the eye to work freely, whilst the side from the open space to the bows spring together and remain close, except when the eye is forced in or out. By this arrangement they are not liable to become unfastened by accident.

Claim fourth.—Mode of constructing brace buttons with rounded or smoothed holes to avoid cutting the thread.

Two discs of metal, one being longer than the other, are formed into a brace button. The large disc has four holes punched through it, and its edge turned over by a press. The small disc just fits into the space between the rim, and receives the burs from the four holes into four other holes. The two are then placed between discs, which render them solid and impart the proper form.

Claim fifth.—The improved buckle as described.

The buckle proper consists of a frame lever notched on its front or outer edge. This lever is enclosed in the buckle frame; the strap or band is fastened to it in any ordinary way. The end to be held is passed under the ends of the lever tongue, and over the frame of the buckle, when it will be held firmly by the pressure.

Claim sixth.—The application of a centre piece to the bands of trousers or waistcoats.

This centre piece is to unite the two ends of the bands of trousers and waistcoats, instead of lacing, as is usual.

Claim seventh.—The method of connecting or fastening trouser straps.

On the end of one strap a brass stud is fixed. On this stud a piece of metal slides backwards and forwards. This is first pushed backwards, and a hole that has been formed in the other strap is then brought over the stud, and the slider pushed forwards, which will then hold it in its place.

John Joseph Mechi, of Leadenhall-street, cutler, *improvements in apparatus to be applied to lamps, in order to carry off the heat and other products of combustion*, Jan. 10.—Claim. Mode of applying apparatus to lamps for the purpose of carrying off the heat and other products of combustion.

In these improvements the burners are to be placed as near the ceiling of the apartment as possible. Just over each an aperture is to be formed; and the whole surrounded by suitable reflectors. The apertures over the burners communicate with tubes, by which the products to be carried off are conveyed into a chimney above, or in any required direction to the external air. The heat so passed through tubes may be applied to the purpose of heating apartments, as is shown in the specification, but forms no part of the improvements claimed by the inventor.

ENTERED AT THE ROLLS CHAPEL OFFICE.

(*Continued from page* 36.)

William Palmer, of Fleetwell, Norfolk, blacksmith, for *improvements in ploughs*, Jan. 8.—These improvements are intended to reduce the friction of the draught, to enable the plough to accommodate itself to any required depth of cutting, and to afford a more accurate means of directing its course. This is effected by dispensing with the slade, and causing the hinder part of the plough to be supported upon a wheel of about 18 inches diameter. This is attached to a saddle iron by an axle or pin. A rod extends vertically from the upper part of the saddle iron to a bridge affixed to the beam and to the handles. A screw is cut upon the upper end of the vertical rod, on which a nut turns, by which means the wheel and saddle iron are raised or depressed according to the required depth of the cut. The bracing is formed of a piece of iron of half an inch thick, and has three arms, the two upper ones being securely fixed to the beam and handles by bolts, and the lower one having a long slot in it, through which the axle of the wheel passes at whatever height it may be adjusted by the rod and nut. The situation of the mould board is just before the wheel, and the frame behind it; and by the wheel moving in the furrow the under parts of the breast and of the frame are kept from coming in contact with the ground.

The next part relates to a peculiar construction of "hake," by which the draught chain may be adjusted so as to regulate the draught of the plough. This hake is fixed at the end of the beam, and consists of a frame which carries two pins perpendicularly, one of which is a screw, the other is plain. These two pins pass through a socket, to the outer end of which the draught chain is fastened. On the screw being turned, the socket will slide freely over the smooth pin, and move to, and be held in, any place by the screw. The last part of these improvements relates to the adjustment of the coulter. The cylindrical part passes through a socket formed on the end of a screw-bolt or shank. This screw-bolt passes through two disc plates, and through the beam, and is secured by a winch handle on the opposite side, turning on the end of the bolt. By this means the coulter may be placed at any required height. One of the disc plates is of a wedge shape, so that by turning the thin part any way, the edge of the coulter will incline in the same degree, and thus admit of the coulter being also set to the required angle.

Joshua Taylor Beale, of East Greenwich, engineer, for *certain improvements in steam-engines*, Jan. 9.—Claim first.—The general combination and arrangement of the separate parts represented.

Claim second.—The use of a bar, by which no framing is required, nor any other support than that derived from the shaft.

These improvements apply to rotary engines; one modification of which is as follows:—The engine consists of an elliptical shaped chamber, to the inside of which two cams are placed opposite to each other, and fixed by pins to the casing. There are eight pistons, which are kept in contact with the inner surface of the chamber by passing over the cams. A drum, having a series of grooves formed in it, is keyed to the main shaft. Through these grooves the pistons work; above and below this chamber are steam and eduction passages, regulated by suitable valves. The steam is introduced at the upper part of the chamber, and causes the pistons to move round towards the exit passage at the bottom, where it escapes. For reversing the motion of the engine, the rods of the upper and lower valves are connected, one to each end of a lever, the fulcrum of which is in a line with the centre of the engine; this lever is moved by a handle, which, on being moved backwards and forwards, will open or shut the valve required; and by which arrangement the most perfect control of the engine is obtained. When this invention is applied to a locomotive or marine engine, a bar is fixed in the chamber, to prevent its turning, and in locomotives is held by being fitted in a socket, or in any part of the framing at the end,

Claim third.—The application of the boiler, where great lightness and compactness are desirable.

These are constructed of a long tube coiled in the form of a cage, inside which the fire is placed. Water is pumped into one end, and the reverse end is attached to the engine, so that the water is exposed to the action of the fire throughout its entire length.

Claim fourth.—The use of lime in the manner and for the purposes set forth.

The water used in this invention has lime added to it until it is very slightly alkaline. The inventor observes that by precipitating the free carbonic acid and the carbonate of lime, contained in ordinary water, that incrustation and priming are in a great degree prevented.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page* 36.)

William Ash, of Sheffield, manufacturer, *improvements in augers, and tools for boreing* (being a communication), Dec. 24.—Claim.—The application of moveable cutters and guides to a shank or spindle, as described.

A shank or spindle has a pointed screw formed on one end, the size of the thread varying according to the different kinds of wood for which it may be required. On the side of the shank, and some distance up, is a circular stop for the purpose hereafter named; there is also a square aperture in the lower part just above the worm, and running through the spindle.

The cutters and guides are formed separately, and consist, the guides of helical pieces of various sizes on their outsides, but all fitting the spindle in their interior, the cutters of rectangular pieces of steel with a cutting edge, somewhat similar to one side of a centre bit. The helical piece or guide of the size required is first passed over the shank until it reaches the circular stop. One end of the cutter is then introduced into the square aperture, below which place it is firmly fixed by a wedge, which butts against the lower end of the helical piece, or guide, thereby rendering the same perfectly tight. On a different sized hole or bore being required, the wedge is first to be hammered out, when the other parts may be easily removed. Another form of guide is shown, consisting of a circular plate with

a thimble in the centre, supported by two cross pieces of metal from the outer edge; but the first or helical guide is preferred, as being longer, and affording a channel for the exit of the chips, and thereby keeping the hole perfectly clear during the process of boreing.

William Wood, of Wilton, carpet manufacturer, for *improvements in looms for weaving carpets and other fabrics*, Dec. 24.—Claim first.—The application of a weighted cord, strap, or chain, directly to the coil of yarn on the bobbin, by means of which the leverage, against which the weight pulls, becomes greatly decreased in proportion as the yarn or thread on the bobbin becomes worked up, or the radius of the coiled yarn reduced.

The inventor states that it is customary to gain the necessary strain or leverage on the yarn, while the same is being woven, by means of a weighted cord, fixed by one end to a point in a groove formed in one end of the bobbin for the purpose; by which means great irregularity of weight or strain must necessarily be imparted to the yarn at different periods of its being used. The object of the first part of this invention is to remedy this irregularity, and it is effected by passing a ring of metal over the thread of yarn under operation, to which ring one end of the weighted cord or chain is attached; this being allowed to hang down from the back part will give a uniform and steady strain to the yarn throughout the whole progress of the unwinding of the bobbin; the weight gradually decreasing in the same proportion as the radius of the coiled yarn, on the same being worked up.

Claim second.—The peculiar method of mounting the bobbins with their axles in metal frames.

The object of this part of these improvements is to reduce the friction on the axles of the bobbins, and also to mount them in frames in such a manner that they may work perfectly clear of each other. These objects are effected by providing the plates of metal with suitable openings to receive the axles of the bobbins, and which may be supported by pieces of wood, or in any other convenient way; the hinder end being raised, that the yarn as wound from the surfaces of the back bobbins may not interfere with the others it may have to pass over. These thin pieces of metal are placed parallel to each other, and at a proper distance, regulated by the length of the bobbins, and are ranged in such a manner that the openings formed to receive the axles may intersect each other, by which means the bobbins will work perfectly free, and without any liability of interfering with each other.

James Harvey, of Basing-place, Waterloo-road, gent., for *improvements in extracting sulphur from pyrites and other substances containing the same*, Jan. 8.—Claim. The improved method of subliming sulphur, downwards, from pyrites and other substances containing the same, as described.

A furnace is constructed that the heat may pass along the centre of a horizontal chamber, then come back on both sides to the front, and return towards the back at the extreme sides of the chamber; beneath this chamber there is a second one formed of metal, slate, or stone, the roof of which forms the bed of the upper chamber; pots made of iron, fire-clay, or other proper material, and formed like frustrums of cones, and having their bottoms perforated with holes, pass through and are suspended in apertures formed through the tiles of which the roof of the upper chamber is composed, their lower ends passing through holes in the roof of the lower, or sulphur chamber. The floor of this chamber is covered a few inches deep with water. Pyrites, or other substances containing the sulphur, are first broken in lumps of about the size of a man's fist, they are then placed in the pots which are suspended as described. These are then securely fastened down and the heat of the furnace raised, which will play round the pots, and the sulphur in vapour be admitted through the perforated bottoms into the closed chamber beneath; where it will be condensed by the water on the floor, and retained in the form of flowers of sulphur. A pipe, furnished with a cock or valve, leads from the back part of this chamber, and causes a very gentle current of air which promotes the separation of the sulphur from the pyrites. Before re-charging the pots, the furnace must be allowed to cool.

INFRINGEMENT OF PATENTS IN FRANCE.

The *Moniteur Industriel*, in allusion to the present unsatisfactory state of the patent laws in France, complains that the judges, in deciding questions of infringement, look more to the form of the machine than the principle on which it is founded. Were they to proceed on the latter ground, the question could be generally easily determined; but, as it is, questions of infringement give rise to much incertitude and injustice. The following case, which was decided by the Correctional Tribunal of Rouen, on the 31st of last month, is adduced as an instance. The report of the proceedings was furnished to the *Moniteur* by M. Bresson, an engineer at Rouen.

In 1828 Messrs. Perrott and Valley invented a machine for reducing dyeing woods into powder, by cutting them at the end, that is, perpendicularly to the grain of the wood. This machine is composed of a small carriage, on which is fastened the billet that has to be cut, and by means of a series of wheels this carriage receives a progressive rectilinear motion, which brings the wood in contact with the pulverising instrument. This instrument is an iron horizontal shaft, placed at right angles, to the direction in which the carriage moves. It is fitted with notched rings, or small toothed wheels, firmly fixed to the shaft, which then forms a cylinder, covered over with spikes. This cylinder, having a very rapid motion given to it, breaks, cuts, and at length pulverises the wood, which, by the motion of the carriage, is applied constantly on the surface of the cylinder. We must remark, that each ring has only three cutting teeth attached to it; these teeth are moveable, that they may be more easily ground. This arrangement also admits of their being made of steel very highly tempered. In addition, the plane of each ring is perpendicular to the shaft, and the various rings are in contact, but their teeth cross each other, that is, they altogether form helicoidal lines, on a cylindrical surface. Such are the chief characters of the machine invented by Messrs. Vallery and Perrott. As to the specific characters of the produce, they consist of small chips, and small grains of wood, about the twentieth of a millemetre in diameter, which differ materially from the powdered grains pulverised on the old system with pestles, or in mills, inasmuch as they consist of small fibres of wood, and that by merely washing in water, this granulous powder is easily separated from the stuffs with which it comes in contact in the process of dyeing.

In 1837 Messrs. Barker and Rowcliff took out a patent of invention for a machine literally constructed in the same manner and producing the same results. The only difference consisted in the pulverising instrument, which, instead of being made of rings, each containing three moveable teeth, was made of rings, or discs, notched on their circumference, like common circular saws. These gentlemen afterwards experiencing difficulties in grinding the saws, inclined them towards the discs of the shaft.

Thus the question to be decided was this—In the machine of Messrs. Barker and Rowcliff each ring, or disc, contains a greater number of teeth, and these teeth are fixed; besides, the plane of the rings is inclined to the axis of rotation. Does this constitute a new invention? M. Bresson is of opinion that it does not; that it is only an alteration of the same principle. The Correctional Tribunal at Rouen were of a different opinion. The following is its decision:—

"The Tribunal declares that the machine of Messrs. Barker, Rowcliffe, and Urruty, is not an infringement of the one invented by Messrs. Vallery and Perrott. Condemns Pethier, granter of patents to the latter, to the penalty of 400 francs damages to Barker and Rowcliff. Condemns him to pay the expenses, and orders, farther, that the present judgment shall be inserted in the journals of Rouen, and fifty copies posted up."

What conclusion is to be drawn from this? That a better law, one less elastic in its application, is urgently necessary, and that inventors are greatly interested in earnestly petitioning for it.

FOREIGN INTELLIGENCE.

FRANCE.

At the meeting of the Academy of Sciences on the 11th inst., M. Regnault, who has distinguished himself by his researches respecting the specific heat of different substances, read a paper, containing the results of some further experiments on the same subject. In this paper he mentioned a curious fact, relative to sulphur, when solidifying, after it has been previously reduced to the state of a paste. It is known that sulphur, when kept in fusion for a certain time, changes its color—becomes of a hyacinth red, and acquires the property of remaining soft for a long time, by plunging it into cold water. M. Regnault has observed, that sulphur, in this state, when submitted to a temperature of about 98 degrees (centigrade) in a stove, liberates a great quantity of heat in becoming solid, so as to raise the thermometer suddenly to 110 degrees. When the solidification is effected, the thermometer returns to the temperature of the stove, and there continues.

A singular trial is about to take place before the Tribunal de Premier Instance. When the celebrated Dr. Pinel died, in 1826, his most distinguished pupils thought they ought to dissect his body, for the benefit of science. M. Esquirol, for the sake of preserving a *souvenir* of his illustrious master, kept his skull, which he had carefully prepared. M. Esquirol having died, M. Scipio Pinel, the son of the Doctor, reclaims his father's skull, as the only legal possessor, having, as he says, only allowed it to remain with M. Esquirol out of respect to him. This claim is disputed, and the cause, it is said, is to come to trial.

M. Tillorier, (the chemist in whose lecture room, at Paris, the recent explosion of carbonic acid gas took place, which killed M. Hervy, a very promising student,) has undertaken the dangerous experiment of attempting to liquefy atmospheric air by pressure. The apparatus for this purpose has been nearly completed. To effect the liquefaction of air, he contemplates compressing it more than 2,400 atmospheres, instead of 100, to which extent he carried his compression of carbonic acid gas.

Supply of Food to Paris.—The following was the consumption of Paris during the month of December last:—5,972 oxen, 2,082 cows, 5,303 calves, and 38,254 sheep; which, compared with the returns of the corresponding month of 1839, gives an increase of 310 oxen, 14 cows, and 4,082 sheep for December, 1840. The augmentation may be accounted for by the great number of strangers who arrived in Paris to assist at the funeral of Napoleon. The consumption during the entire year amounted to 71,569 oxen, 20,921 cows, 71,799 calves, and 432,540 sheep; showing an increase of 2,050 oxen, 1,990 cows, and 18,429 sheep, as compared with that of 1839. There was a falling off in the consumption of calves of 4,326, owing to the agriculturists not sending to market the usual supply, and keeping them back to fatten them, in order to make up for the deficiency of bullocks, which was daily felt more and more. The *Commerce*, from which we borrow these details, is of opinion that the Government will be obliged to permit the free importation of foreign young oxen into France. "This measure," it says, "is becoming more urgent, for meat increases in price at every market, and if the administration suffers

spring to go over without attending to that great economical measure, cattle will become so scarce that meat will ere long be an article of luxury."

The *Constitutionnel* announces that the Minister of Finance would shortly present to the Chamber of Deputies a project of law relative to the outlay of the loan of 450,000,000f. The amount which is to be appropriated this year to the construction of public works, unprovided for in the budget, will not exceed 33,000,000f. This is a falling off of 221,312f. in the estimates of last year, and this seems to be the only branch of public expenditure on which any diminution has taken place.

Revenue of France.—The *Moniteur* of Friday publishes a compendious statement, or account, issued from the Finance Department of the French Government, which gives comparative statements of the receipts (produced by duties in direct taxes, &c.) of the year 1840 and those of the years 1838 and 1839. From the comparative statement of the receipts of the year 1840 and those of 1838, it appears that in the former there has been an increase over those of 1838 in the following items—viz., in the register, stamp, and mortgage duties, an increase in 1840 of 5,288,000f.; in the customs and navigation duties, 5,107,000f.; in the duties on foreign sugar, 1,413,000f.; in the duties on liquors, 3,434,000f.; in the duties on home-manufactured sugar, 3,855,000f.; in various indirect taxes, such as those on public conveyances, &c., 1,520,000f.; in the taxes on tobacco, 9,270,000f.; in the duties on the consumption of salt, collected at the manufactures on the coasts, 1,782,000f.; on the taxation of letters, and the duty on remittances of money, 2,589,000f.; there is, likewise, an increase in favor of 1840 upon several other items. The only one in which a diminution was sustained is in the duties on French colonial sugar, in which there appears a difference of 3,520,000f. in favor of 1838. The total net increase in 1840 amounts to the sum of 32,450,000f., of which 31,875,000f. was produced in the first nine months of 1840, and 575,000f. in the last three. From the comparative statement of the receipts of 1840 and those of 1839, it appears that upon the following articles there has been an increase in favor of 1840—viz., in the register, stamp, and mortgage duties, an increase of 4,190,000f.; in customs and navigation duties, 6,962,000f.; in the duties on foreign sugar, 3,914,000f.; in the liquor duties, 2,475,000f.; in the duties on home-manufactured sugar, 1,184,000f.; in indirect taxes (public conveyances, &c.), 747,000f.; in the produce of the sale of tobacco, 4,159,000f.; in the taxation of letters, and the duty of 5 per cent. on remittances of money, 1,504,000f., besides an increase in several other items. A diminution has been sustained in 1840 upon the following—viz., in the duties on French colonial sugar, 812,000f.; and in the duties on the consumption of salt, collected in the interior, 9,000f. The total net increase in favor of 1840 amounts to the sum of 25,246,000f., including a diminution in the last three months of that year of 877,000f. From these statements it would appear that there has been an increase in the receipts of 1840 over those of 1838 of 32,450,000f., and in the receipts of 1840 over those of 1839 one of 25,246,000f., making altogether a net increase of 57,696,000f.

BELGIUM.

THE FELTED CLOTH PATENT IN BELGIUM ANNULLED.

At the request of the manager of the Phœnix Society, a royal decree, dated the 2d of January, has been issued, annulling the patent of invention granted on the 1st of July, 1839, to Mr. T. Bowling, of Brussels, for different modifications and improvements in various kinds of felted and other manufactures, adapted for carpets, druggets, &c., as well as for the machines for making them; and for improvements in the manner of preparing cow's hair, &c., so as to produce, by felting, some of those manufactures. The cause of the annulment of the patent is stated to be, that the invention had been previously described in the "Repertory of Patent Inventions." The patent had been purchased by the Belgian Government, according to the provision of the law which allows the Government to buy from inventors their rights to exclusive manufacture, when an invention promises to be of public benefit. The sale of the machines for making felted cloth, which had been already constructed, was ordered to take place by authority.

The *Fanal* makes the following remarks on the loss of the patent right to so important an invention:

"This is the fate of almost all the great inventions which have honored the genius of man and constituted the happiness of nations. We are, nevertheless, glad to mark that some progress has been made, to the advantage of inventors. Formerly they were killed, had their eyes put out, or were imprisoned; at present we are satisfied to deprive them of their property, to leave them to perish from hunger, or to crucify them in the mode of the nineteenth century—that is to say, by calumniating, caricaturing, and despising them. The more generous, indeed, are so far advanced, as only to charge with folly or eccentricity the men who endeavour to go beyond the narrow circle within which mediocrity is accustomed to be confined.

"It is time, however, to shake off the remains of this Voltairean scepticism, which consists in deriding the best established facts, because they have not been seen, even when no attempt is made to see them. It is the part of wisdom to doubt; but honesty requires an examination. The Academy of Sciences, after having for a long time doubted the existence of showers of stones and of frogs, took the trouble to send commissioners to the places where these phenomena occurred. The commissioners were convinced, and the fact is admitted, though it is impossible to comprehend it. The endeavour of all Royal Societies ought to be to act in the same way; and the duty of every minister of public instruction is to hasten to examine almost all discoveries to which public rumor gives the least appearance of reality; for there is as much utility in denouncing error and exposing charlatanery, as in directly advancing the progress of science."

EXPERIMENTS ON STOVES.

It is well known that a very considerable saving of expense can be made in coals, since it has been calculated that in France a hundred and forty millions of francs are expended annually in fuel, though a third part of that amount is not actually consumed. This truth is so generally acknowledged, that inventions of stoves arrive from all quarters, each of which is announced as the most perfect and most economical. Those that meet with most patronage are usually not those which are the best, but almost always those that are manufactured by persons who best understand the art of making them publicly known. Government has determined to put a stop to this uncertainty by establishing a competition for stoves, on the same plan as that of the competition for the best ploughs. The Academy is to superintend the experiments, which will be carefully made in the same place, which will be furnished with thermometers and with one kind of coals. These experiments will continue as many days as there are stoves to be submitted for competition, with notes taken every quarter of an hour. The publicity given to the report of the Academy will be an ample recompense to the most successful.

REGULATIONS OF THE BELGIAN RAILROADS.

(*Concluded from page* 37.)

THE GUARDS OF TRAINS.

24th. The chief guards are especially entrusted with the superintendence and regulation of the trains.

25th. In every journey they are bound to accompany the train under their care, and cannot absent themselves without a permission in writing from the inspector.

26th. They shall take care that a train never sets out without the breaksman being at his post. The breaksman shall take his station in the train at least five minutes before its departure. During the journey the breaksman shall always be situated so as to be able to put on the break immediately. He must not descend from his place at the intermediate stations, unless the engineer requires his assistance.

27th. As soon as travellers are admitted into the station, the guards shall place themselves before the carriages which have been entrusted to them, and shall announce to the travellers into which of the carriages their ticket will admit them.

28th. The guards appointed to superintend the trains and to receive the tickets shall point out to the travellers their respective places.

29th. The guards are strictly prohibited from admitting any person into the train who is not furnished with a ticket.

30th. Each guard shall receive from the manager a trumpet and a lantern, for which he is responsible. He is bound to carry his trumpet always in his belt, under the penalty of a tax of five francs.

31st. At the signals for departure, each of the guards shall ascend the carriage appropriated to him; shall examine the tickets of the travellers; and shall immediately place apart the tickets of those who are to be put down at the nearest station.

32d. Should they perceive that a man in a state of intoxication has taken his place in a carriage, they shall apply to the police officers to expel him; and should it be necessary, he must be left at the military post, till the next train arrives.

33d. At each intermediate station the chief guard shall descend from the carriage, and superintend the departure and the entrance of the passengers from the carriages.

34th. At the intermediate stations, where there is no office, the price of places must be received by the guards. They are strictly prohibited from charging more than the price of a fare from an intermediate station to the next principal station.

35th. The chief guards shall be particularly careful to see that the other guards pay the greatest attention to the passengers. In case of any dispute between a passenger and a guard, the chief guard shall immediately interpose, and give the passenger any explanation he is at liberty to ask.

36th. The guards are ordered to behave to the passengers with the greatest politeness. Any authenticated complaint made by a passenger on this subject shall be sufficient to cause the dismissal of a guard.

37th. In case of any dispute between a passenger and a guard, the latter shall immediately apply to the chief guard.

38th. No complaint ought to be addressed, no observation ought to be made, by the passengers, to the engineer; to the chief guard alone belongs the regulation of the trains.

39th. The chief guard shall appoint the place that each of the guards under his orders is to occupy in the train, and the number of carriages confided to him. He shall take care that there is never more than one guard in the same carriage.

40th. During the journey the guards shall occupy the place nearest to the door, so as to admit of their being able to hold communication, not only among themselves, but with the engineer and breaksman, and to give and receive signals in case of accident.

41st. The guards shall take care that the passengers remain seated during the journey, and that there is no smoking in the covered carriages. In rainy weather, they shall take care that either the windows or curtains are closed on the side where the wind comes.

42d. Every complaint against the guards must be entered in the register of complaints, or addressed to the directors.

43d. The guards are expressly forbidden to take charge of any letters, parcels, or messages, which are not sent by the managers of the roads. Every letter or packet sent by the managers shall always be countersigned by tho officer or person employed to make the parcel.

BARRIER GUARDS.

44th. At every place where the railway is crossed on the same level by causeways, roads, or paths, however little frequented, there is established at the distances of at least five metres outside the railroad, a moveablo rail, with a small houso for a guard.

45th. The barrier guards, as well as the intermediate guards stationed on the road, shall, when the railroads are at too great a distance from each other, wear a uniform and a number in a conspicuous place on their hats.

46th. At the usual hour for the trains passing, or at the time when they are expected, the barrier guards shall remain standing at the distance of at least two metres beyond the outward rail, and as much as possible to the right of the arriving trains. The workmen employed at the barriers shall take care to close the passage on each side the railway, in time enough to prevent any foot passenger, horse, or carriage from obstructing the road, or from crossing it when the trains are in sight. They shall prohibit and prevent every carriage from passing along the road, and even the carts which are intended to be used in the service of the railroad cannot be admitted, unless they have a written order from the superior, countersigned by the engineer. The guards should oblige every person on horseback, every driver of a mail, diligence, carriage, or any equipage whatever, or herds of cattle, to keep at least ten metres distant from the road where the trains are expected, and shall not allow either them or foot passengers to cross the railway, till after the train expected or in sight shall have passed.

RISE AND PROGRESS OF MANUFACTURES IN BELGIUM.

(*From the Colonial Magazine for Jan.* 1841.)

At the period of the fall of the French Empire, Belgium possessed twenty cotton-spinning factories, containing 85,000 spindles. From the peace, the cotton manufactures of Belgium gradually decayed for several years, until at length resuscitated by the indefatigable exertions of the King of Holland, then of Belgium also. By every species of encouragement, by himself embarking large capitals in manufactories, the manufacture was restored and rendered more flourishing than ever. In Ghent, where two-thirds of the whole are concentrated, the number of spindles in 1826 did not, however, still exceed 250,000; but in 1830, from the constant and persevering efforts of the sovereign, the number was increased to 283,000 for that city, which gave for the whole of Belgium 440,000. The consumption of raw cotton was estimated at that time at 7,500,000 kilogrammes, which in round numbers may be taken at 16,000,000 lbs. After the revolution in the last-named year, the manufacture was involved in the greatest disasters. The imports of cotton in 1831 had fallen to 1,915,158 kilogrammes, and fluctuated as follows:—

	kils.		kils.
1831	1,915,158	1832	5,008,024
1833	6,171,231	1834	4,479,207
1835	4,802,541	1836	6,712,935
1837	7,003,968	1838	6,936,942

Thus the manufacture in 1838 had not recovered the importance to which it had attained in 1829 and 1830, under the administration of the King of Holland. At the same time, it was making elsewhere an extraordinary progress. Thus, France imported cotton to tho extent, in 1829, of 32,000,000 kilogrammes; in 1837, 55,000,000 kilogrammes; being an increase in the rato of 72 per cent. And England, in 1829, 204,000,000 lbs.; in 1836, 363,000,000, or at the rate of increase of 76 per cent. Notwithstanding this backward state, Belgium possesses advantages for the prosecution of the manufacture over both France and England. Thus the first cost of a cotton-mill in Alsace is estimated at 50 francs the spindle; whereas, in Belgium, it is only 34 or 35 francs. Wages are as low in Belgium as in France, and both lower than England. Capitals are more abundant there than in France, and yet the largest factory in Belgium does not exceed 15,000 spindles; whilst at Mulhausen there is one containing, at least, 95,000 spindles. Although Ghent now has 2,900 power-looms at work, which is more by 2,200 than it had in 1830, yet in six years, counting from 1838 back to 1833, the exports of cotton from Belgium had fallen off 60 per cent.; that is, from 1,084,055 kilogrammes in 1833, to 493,123 in 1838. The extent of production by power-looms is calculated at 40,000,000 ells of calico, and about 25,000,000 more are woven by hand-looms.

RAILWAY INTELLIGENCE, DOMESTIC AND FOREIGN.

Mails by Railways.—The North Mails from Cheltenham to Birmingham are to be put upon the railway on the 5th of next month, on and after which date the up-mails will leave Gloucester at seven and nine p.m., and the down return mails will start from Birmingham at three and five a.m., daily.

Gloucester and Birmingham Railway.—The traffic returns of the Gloucester and Birmingham railway, for the week ending January 1, amounted to £1,115, 1s., being the largest return yet realised on this line, the proceeds of which have been steadily advancing ever since it has been opened through its entire length. Tho working of the line during the recent trying weather has been most satisfactory, and the trains generally keeping their time.—*Cheltenham Looker-on.*

Lieut. Col. Sir Frederick Smith has returned to town, having completed his inspection of Nithsdale and Clydesdale projected lines of railway between Carlisle and Glasgow. His colleague, Professor Barlow, is expected to return to-day from his examination of Mr. Gibb's line by Cambridge and Lincoln to York, and also of a proposed line through Morpeth, competing with Mr. George Stephenson's line from Newcastle to Alnwick, in the east-coast route to Edinburgh.—*Railway Times.*

South-Eastern Railway.—On Monday a public meeting was held in the Guildhall, Canterbury, the Mayor in the chair, for the purpose of considering the propriety of supporting a branch line of railway from Ashford to Canterbury, and ultimately to Ramsgate. The meeting was attended by most of the influential persons in the city. Mr. Fearon, on behalf of the company, stated the nature of the line, which would be very cheap and easy of execution. He said that the South-Eastern Railway had overcome all its difficulties, and would be completed to Ashford by the latter end of 1842. After some discussion it was determined, by a very large majority, to support the branch line, and a committee was formed on the spot for the purpose.

Important Railway Meeting in Ireland.—A most influential meeting was to be held in Dublin, on Thursday, for the purpose of considering the best means of having a comprehensive system of railways established in Ireland, under the control and direction of the State. The requisition convening the meeting contained 500 names, headed by the Archbishop of Dublin, and followed by the name of 68 peers. The account of the proceedings had not arrived in London at the time we went to press.

Application to Set Aside the Harrow Inquest.—In the Bail Court on Monday, Sir W. Follett applied for a *certiorari* to bring up the inquisition which had been taken upon the death of Simpson, one of the engineers of the London and Birmingham Railway Company, and Dawson, who was also in the service of the company. The jury had found that Simpson had murdered Dawson, and that Simpson himself was *felo de se.* Sir W. Follett said there were various objections to the inquisition, but one alone would be sufficient to entitle him to the rule for which he prayed. It appeared that the jury having found that Simpson had murdered Dawson, and afterwards murdered himself, and that he was, therefore, guilty of two felonies, went on to find that the carriages were moving to the death of the parties, and levied a deodand upon them accordingly. To find that the carriage was moving to the death is in fact to find that the death was the result of accident, and the inquisition was, therefore, upon the face of it, inconsistent with itself; whilst the deodand was illegally awarded, as it could only be levied where an inanimate thing was itself the sole cause of the death. Where the killing was found to be felonious, the party who caused the death forfeited all his goods and chattels, and the giving of a deodand in such a case was against the principle of utility as well as in opposition to the rule of law. Mr. Justice Williams observed that the question was important, and granted the rule.

Dangerous Practice.—A very dangerous practice prevails on the Monkland and Kirkintilloch railway, which has recently terminated in the death of one of the company's servants. It appears, that on that line there is an inclined plane of 1 in 60, worked by locomotive power, both for passengers and goods. The coal trains have only the engine driver and fireman, the latter acting also in the capacity of breaksman. On reaching the top of the plane, the fireman of the coal trains proceeding towards Glasgow descends from the tender, while the train is moving at the rate of about five miles an hour (as stated, but it is to be presumed at a much more rapid rate), and lets down the lever break as each wagon passes him. He then gets on the hinder wagon, and rides down upon it to the foot of the plane, where it is not unfrequent for the fireman to take off the breaks while the train is *in motion*, and to resume his place on the tender.

Effects of the Snow and Frost on Railways.—The effect of the snow in impeding the progress of railway trains, was more experienced on Thursday week than on any previous day during the winter. The Liverpool, Manchester, and Birmingham mails came in by railway at the usual hour, but without the Glasgow, Edinburgh, or Gloucester bags. The Glasgow and Edinburgh bags arrived by the Birmingham railway in time for the mid-day delivery. The Bristol mail arrived at 2 o'clock. On Thursday night no less than three engines were attached to the Birmingham mail-train, and it was brought up to town by a similar number on Friday morning. Extra engines were also employed in propelling the mail-train on the South-Western and Great Western lines. At tho terminus of the South-Western railway there was no arrival from the 2 o'clock train on Thursday till the mail-train of Friday morning, and it was stated that an engine of one of the intermediate trains had become imbedded in the snow some miles above the Woking station, and from which the united force of six engines could not extricate it. By the aid of workmen in excavating the snow, a free communication was restored, and the afternoon trains of Friday came in nearly as due. On the Birmingham and Great Western lines the trains were delayed, as, notwithstanding the power of additional engines, the wheels of the carriages would not "bite" on the rails. From the accounts given by guards and travellers, it appears that the effects of the snow were principally felt in the western and south-western districts, and that a large belt of drifted snow extended over the country from Basingstoke and Andover to Devizes, including Salisbury-plain, and equally over the unprotected country of the chalk hills, beyond Marlborough. The Bristol mail to London was left a few miles

on the other side of that spot, the bags having been brought on by the guard by post horses across the fields, where the snow had not accumulated. The Eastern Counties railway trains came in as usual, and thero was no delay in the arrival of any of the branch coaches connected with it. On Thursday morning one of the trains on the North Eastern railway, coming towards Broxbourne, was stopped before arriving at the Waltham Cross station, by the freezing of the water in the pump, or syringe, which supplies the boiler. It had been found necessary to thaw this pump several times previously on the journey, but on this occasion it resisted every effort, and the passengers had the agreeable alternative of returning to Shoreditch by another train, or of performiug the rest of the journey on foot.

Floods on the Eastern Counties and Northern and Eastern Railways.—The accumulated water in the Hackney and Essex marshes on each side of the river Lea caused great injury on the Northern and Eastern Railway, in several places between Lea Bridge and Stratford. On this account a notice was placed at the station at Shoreditch on Sunday, that no more trains would run until a further announcement; and later in the day it was ascertained that on the part near Broxbourne a considerable part of the line had been overflowed. The closing up of the railway was more a matter of judicious caution on the part of the directors than from anticipation of real danger. The train of the Eastern Counties Railway came in as usual, although at Seven Kings Waters, near Ilford, the carriages had to pass through above a foot of water. All the branch coaches arrived at their usual time, and there was no delay in the arrival of the trains. A passenger by one of the trains on Saturday describes the effect of the traius passing through the waters as very singular, and at first extremely alarming. The rapid motion of the wheels caused the water to make a loud rushing sound, unlike any thing heard in land travelling; whilst the constant falling of the hot cinders into tho water, was added to the noise. The appearance of the country, too, all traces of the liue of rails being lost, naturally added to the fears of the passengers. On a survey of the damage done to the Northern and Eastern Railway, it has been found that a depression of the embankment has occurred between Lea-bridge and tho line of the Eastern Counties Railway, so as to remove the sleepers. The trains have not proceeded on the lino since Suuday. On that day, about half-past one o'clock, the train that went down to Broxbourne was compelled to return, upon reaching Lea-bridge, to the station at High-street, Shoreditch, when the passengers received back their money. The directors of the company have since provided conveyances, at railway prices, for those persons who have been in the practice of travelling by the line.

Floods on the Great Western Railway.—The floods consequent on the sudden thaw have had the effect of partially stopping the traffic on the Great Western Railway, by washing down the embankment in some places. Stoppages took place from this cause on Saturday, which are thus described by Mr. G. R. Dodd, a passenger, in a letter to the *Times*:—

"Sir,—As there is no doubt you will have various statements as to the stoppage which took place on the Great Western Railway on Saturday last, in consequence of the sudden thaw, I think it right, as one of the parties unfortunately detained on the occasion, to give a short statement of the occurrence. I do so more particularly, that I may have the opportunity of bearing testimony to the good conduct of the conductor and guards, also the workmen.

"I left Reading by the train at a little after 6 o'clock in the evening (as I constantly do every Saturday), and on arriving at Twyford we took up about 20 labourers in order to set them down at a spot about two miles further on, where it appears some water had for tho last hour been issuing from the side of the cutting, which in that place is very deep. On arriving at this spot the train was stopped in order to put the men down, and it so happened that the carriage in which I sat came just opposite to the stream which was forcing its way through the bank. At that moment it increased to such an extent that in a very few minutes the wheels of the carriage I was in, and two adjoining ones, were completely buried in chalk and mud. Fortunately the engine had got so far in advance of the spot as to get clear, and then went on to Slough station for some carriages in which to remove the passengers.

"This new train in the course of two hours was able to back down on the other line to within 20 yards of us, and the guards and labourers then carried us all to it through the water in safety.

"The men had all the interim been engaged in the water, endeavouring to turn the course of the mud along the sides of the railway.

"We again started, and reached a spot within two miles of Slough, and again we were fixed in the same way, and fortunately the engine as before got clear. We were here detained another three hours, when at length another train was backed on the other line to our assistance, and we were for a second time transhipped. We shortly after arrived at the Slough station, and one and all were placed in close carriages for London, where we at last arrived in perfect safety at a quarter past 3 o'clock on Sunday morning.

"I must say that much praise is due to the conductor and guards for their attention and exertions, who suffered very severely, being many times up to their middle in water."

RAILWAY ACCIDENTS.

Negligence of a Railway Servant.—At the Union Hall Police Office on Thursday, William Banks, a "switch-man," in the service of the Greenwich railway company, was charged with neglect of duty, whereby a train of carriages was thrown off the rails, and an obstruction of some duration occasioned on the line. A gentleman belonging to the company stated, that the quarter-past four o'clock train was thrown off the line, in consequence of the switch not having been properly attended to by the man appointed for that purpose. The defendant was the person whose duty it was to have examined the switch immediately before and after the trains went over that part of the line where it was situated. When the train came up to that part of the line, it was thrown off the rails, but no further injury was sustained than that resulting from a delay of about twenty minutes. The defendant was questioned soon after the occurrence, and asked the reason he omitted to examine the switch; and his reply was, that he had been on the spot a few minutes before, and saw that all was right. It was his duty, however, to be in constant attendance at that part of the line, and persons in his situation were often relieved. Mr. Trail asked whether any witness would be called to prove the alleged offence, but the reply was in the negative, as no person was near the spot at the time but the defendant, and that he had made that which was tantamount to an admission of neglect. Mr. Trail said that under all the circumstances of the case, he should prefer leaving the punishment of the defendant to the directors of the company, rather than inflict a small fine upon him. He was of opinion that the infliction of small penalties in such cases would be a bad precedent, and tend to no good purpose in the punishment of offenders for offences of this description. The directors of tho company had the power of discharging a man altogether from their service for a breach of their regulations, of suspeuding him and stopping his wages for any length of time they thought proper. The magistrate added, that in cases where accidents from neglect had arisen, he had determined, upon their being proved, of inflicting the highest penalties on the offenders.

The Fatal Accident on the North Midland Railway.—A coroner's inquest was held on the bodies of the engine-driver and stoker of the mail-train, on the North Midland railway, who were killed on Friday morning, the 8th inst., by their engine running against the luggage train, which had been stopped by the frost. The statements of the witnesses at the inquest added little to the information previously received, as to the cause of the accident. The thermometer was at the time about five degrees above Zero, and the pumps froze, and the boilers could not be supplied with water. The witnesses represented the night to be very foggy, so that the signals could not be seen many yards. The luggage train had just got into motion again when the collision took place, and the two men sent on the road to show red lights had returned to the train, which was moving at the rate of eight miles an hour when the collision took place. None of the passengers in the mail-trains were injured. The jury returned a verdict of accidental death, with a deodand of £300.

Fall of another Bridge on the Midland Counties Railway.—In the night of Saturday last, one of the bridges crossing this line of railway, near Leicester, fell in and obstructed the traffic. The mail train from Derby, arriving soon after the accident, was imbedded amongst the fallen materials, but none of the passengers in the train received any injury. After a detention of four hours, tho obstruction was removed, and the train continued its journey, arriving at Rugby about eight o'clock, instead of one, in the evening. The letters for Lutterworth, Welsted, and Market Harborough, with their respective neighbourhoods, did not reach their destinations until the following (Monday) morning, in consequence of the delay occasioned by the accident.

Embankments carried away by the Floods.—In addition to the above accident, another of a more extensive kind occurred on the same railway, on Sunday night, which is thus noticed in the *Sheffield Iris*, of Tuesday:—The mail train from London was yesterday four hours behind its time in arriving here, owing to a part of the Midland Counties line, near Loughborough, being washed away by the heavy flood now prevailing in that neighbourhood. The train reached the spot where this serious mischief has occurred soon after midnight. Precautiouary measures having been taken to give warning to the advancing train, we are happy to hear, has prevented injury either to the carriages or the passengers they conveyed. The drivers of the train, upon being made aware of the gulph before them, stopped, and shoved back to Leicester. An omnibus was then engaged for taking the mails to Derby, a distance of 25 miles; post-chaises were also procured for tho passengers. The length of embaukment carried away is computed at from two to three miles.

FOREIGN RAILWAYS.

A trial was made of a new locomotive on the Brussels railroad, on the 10th inst., in the presence of mauy engineers belonging to the Belgian railways. The engine was a small one called "L'Economie." The distance from Brussels to Foret, nearly three miles, was performed in seven minutes with a load of 85 passengers, to the great satisfaction of all who were present at the experiment, which was completely successful. This engine is, we understand, to work on lines where tho number of passengers is limited, and a large engine would consequently be uselessly extravagant.

Proposed Railway Communications of France.—The *Journal des Debats* states, that fresh exertions are about to be made to give a stimulus to railway undertakings in France, where these important means of communication have been hitherto more neglected than in any part of Europe, with the exception of the Peninsula. A number of Deputies, belonging to the northern, the eastern, and the south-eastern departments, are about to hold a conference, to arrange, definitely, a plan of railway communication between the north and south of France, which will be then submitted for the approval of the Chamber. The *Journal des Debats* speaks strongly in favor of such a plan, and

observes, that if France can afford to spend so many millions in the foolish project of fortifying Paris, she can at least furnish an equal sum for a great national improvement. The *Journal*, indeed, recommends that the former project should be abandoned, and the amount spent in forming railways. The two railways from Paris to Versailles could, it is said, be rendered available in the chain of communication which is contemplated. Those railways are at present in a drooping condition, and their failure, it is thought, would be the means of throwing a damp on railway speculations in France, which they would be a long time in recovering. Should the proposed plan be acted on, some modification will be made in the Paris and Orleans railroad.

Mode of Warming Railway Carriages.—The *Gazette de Leipsic* says—"Notwithstanding the inclemency of the weather, travelling on the railroad from Leipsic to Dresden has not once been prevented. The trains were only on one occasion delayed a few hours, in consequence of a sudden fall of snow on the rails. The travellers by the first and second class carriages have for some days enjoyed the luxury of having the carriages heated. The process used is very simple. Boxes of hot sand are placed in the carriages at the time of starting, which serve as foot-stools. The heat which escapes from them soon produces a moderate heat, which remains (the windows being kept closely shut) of the same temperature during the three hours and a half or four hours that the journey lasts. This, as may easily be imagined, is a great comfort to the travellers during the frost.

Precautions against Floods on the Belgian Railroads.—The managers of the Belgian railroads, apprehensive of the consequences of the late thaw, have taken precautions to guard the railways from the effects of the expected floods. At all points which are exposed, little dikes have been made on the side of the railway to prevent inundation. These precautions were not however sufficient to keep out the water. In several places we find that the railroads have been covered.

Railroads in New York.—The railroads in New York have been constructed by twenty-eight different companies; five of the principal form a continuous line of 282 miles, of which 204 miles are now in operation; when the railroad from Batavia to Buffalo, for which a charter has been obtained, shall have been constructed, there will be an uninterrupted railroad from Albany to Niagara Falls, of 364 miles, equal to the length of the Erie Canal. The longest railroad in the State, completed by one company, is that from Utica to Schenectady, and the oldest the one from Albany to Schenectady; in the same year with the latter (1832) the continuation to Saratoga Springs was also put in operation. The number of miles of railroads opened at the end of 1839 were 453¼, the number of miles prepared for the superstructure were at the same time 170¼—leaving on all the lines undertaken, 693¾ miles yet to be constructed; the total length of all the twenty-eight railroads will then be 1317¾ miles. The number of railroads upon which locomotive engines are used is sixteen, and their length 423¾ miles, including the Blossburg Railroad; the number of locomotives employed is forty-five, being at the rate of one locomotive engine for 9 4-10th miles of road. The total amount of capital expended for railroads, at the end of 1839, was 11,311,800 dollars; the amount yet to be expended 10,502,500 dolls., which will make the total cost of the twenty-eight railroads, when completed, equal to 21,814,800 dollars, and the average per mile 16,570 dolls. Of the twenty-eight railroads, however, twenty-one are entirely finished; their aggregate length is 438½ miles, and their total cost 8,231,950 dollars; this gives, at an average, 18,773 dollars per mile of road, with a single track, including buildings and outfit. The amount of capital necessary for the construction of the different lines has been chiefly raised by shares, issued to private individuals; in some instances loans have been contracted by the companies, when the amount paid in was found inadequate to complete the works; while to a few companies loans have been granted by the State, or, rather the State issued its bonds to a certain amount, which are given to, and then sold by, the respective companies. With the exception of the Mohawk and Hudson and the Harlaem Railroads, all those in the State of New York have but a single track. The superstructure is of wood, with a flat iron bar fastened upon longitudinal string pieces, except in the Long Island Railroad, where a heavy trail is used. The motive power is steam, a few short lines excepted, where horses are employed; and upon some certain roads, which are but little frequented, horses are used in winter, when the expense of running locomotive engines would exceed the receipts from the traffic. The railroads constructed along the line of the Erie Canal are not allowed to carry freight, except by paying to the State the same amount of toll as is charged upon the canal; all other railroads carry freight and passengers, but derive their profit almost exclusively from passengers, the quantity of freight transported being so small, that the expenses incident thereto do not fall much short of the gross receipts.—*Journal of the Franklin Institute.*

American and Russian Railroads.—The railroad from Boston through Albany to Buffalo, on Lake Erie, will be completed within two or three years, and have a length of 519½ miles, or 775 Russian wersts. Boston, Albany, and Buffalo are situated in nearly a direct line, like St. Petersburgh, Moscow, and Colomna. A railroad connecting the latter three cities, and extending to the river Oka, would measure 774½ wersts, if its length is equal to that of the present turnpike-road. The object of the American railroad is the connection of the fertile Western States with the harbour of Boston; that of the Russian, to connect the not less fertile country on the river Wolga, and the centre of the large empire, with the capital and harbour of St. Petersburgh. In America, this long railroad was commenced in 1832, with the section from Albany to Schenectady, of sixteen miles in length; in Russia, the great work was begun in 1836, with a railroad of equal length between St. Petersburgh and Zarskoe-Selo. The American railroad was undertaken by private individuals, with the assistance of the States.

RAILWAY COMPANIES AND CARRIERS.

In the Court of Queen's Bench on Thursday, Mr. Cresswell showed cause against a rule for a *mandamus*, which had been obtained on behalf of Messrs. Pickford's carriers, against the Grand Junction Railway Company, to command them to charge the same prices, and to convey in the same manner for the applicant as for others, goods required to be brought along the line of their railway.

Mr. Cresswell contended that no rule for a *mandamus* could be maintained in this case, as the demand for the assistance of the court was a demand to call on the defendants to do just exactly what, by the words of the 27th section of the act establishing the company, they were called on to do. The court never would grant a *mandamus* requiring persons to obey the provisions of an act of Parliament. Besides this, he begged to remind the court that in the affidavit of the prosecutor there was no clear and unequivocal statement of a demand to perform what was required being made by the prosecutor, nor of any refusal of the directors to comply with that demand.

Sir F. Pollock, Mr. Richards, and Mr. Cardwell, appeared in support of the rule, and read affidavits which set forth that other carriers, for instance Messrs. Horne and Chaplin, were permitted by the defendants to bring goods under their care all the way from Manchester to London, without changing their trucks; and then the defendants charged those persons for goods delivered to their vans in Euston-square 10s. less than was required to be paid if the goods were delivered on their account by the company all over London. The affidavits stated that the clerk of the prosecutor had on his behalf applied to the defendants, and had asked that the same allowance might be made to him, but that the defendants had refused. This, the learned counsel contended, amounted to a positive demand on one side, and a refusal on the other, and therefore entitled them to maintain this rule.

The Court, however, was of a different opinion. It was for the interest of the prosecutor himself that the demand and refusal should be complete, for otherwise he would be defeated in his object. So far as appeared now, the court did not think that there had been a complete demand and refusal. The rule therefore must be discharged, but not with costs.

THE RAILWAY CONFERENCE.

(*From the Times.*)

On Tuesday last, the 19th inst., a general meeting of delegates from all the principal railway companies in England was held at the Queen's Hotel, Birmingham, for the purpose of considering the best means to be adopted for preventing a recurrence of the accidents which have lately taken place on railways. A numerous and highly influential body of directors, with some of the most eminent engineers and managers of railways, attended. Mr. George Carr Glyn, the chairman of the London and Birmingham Railway Company, was called to the chair; and probably no meeting was ever held where the members represented a larger amount of property. The parties present were the representatives of considerably above £50,000,000 of capital. The utmost cordiality was manifested, and the strongest desire expressed by all present to adopt every possible means of accomplishing the proposed object. Those who were most conversant with the management of railways stated their conviction that by far the greater part of the accidents which had occurred were referable to the neglect and disobedience of orders on the part of railway servants; and while some few casualties must be expected to occur in any mode of locomotion by such immense numbers of persons as are conveyed on railways, it must be to an improved state of discipline and moral responsibility on the part of the men employed on railways that the exemption from accidents must be looked for. In these sentiments every person who delivered his opinion concurred. The deliberations of the meeting lasted for several hours, during which time the regulations and signals adopted on all the principal lines were fully discussed, and the following resolutions were unanimously passed; after which the meeting broke up, with the understanding that a future conference should be convened whenever it appeared desirable.

"Resolved 1. That in consequence of the public anxiety occasioned by the accidents which have taken place on various railways, the companies here represented, in order to profit by the combined experience of the principal lines, have deemed it expedient that a general conference should be held for the purpose of taking into consideration the causes and circumstances of such accidents, and the means that may be desirable of more effectually guarding against their occurrence for the future.

"2. That this meeting acknowledges the grave responsibility which attaches to railway directors, and the obligation under which they lie to adopt all judicious and practicable expedients for insuring the general accommodation, comfort, and safety of the passengers intrusted to their charge; that, under a strong impression of this responsibility, they have assembled on this occasion, and have pursued their deliberations at the present conference.

"3. That this meeting, while it deeply regrets the accidents which have occurred, looks forward with confidence to the beneficial result of unremitting vigilance and habitual caution steadily enforced and established, as the great means of

increased safety to railway conveyance; and accordingly they would deprecate any sudden or hasty legislation on the subject, being convinced that the means referred to, aided by such improved arrangement and mechanical adaptations as a more matured experience may suggest, will amply accomplish the desired object.

"4. That the moral character and general fitness of enginemen and firemen, as well as of policemen and other servants, in the correct performance of whose duties the public safety is involved, are so essential to the security of railway travelling, that this meeting recommends to all railway companies the strictest examination into these points, and that it should be a rule more generally adopted amongst different managements not to employ servants having worked on other lines, without authentic and satisfactory testimonials from their former employers.

"5. That in case of serious neglect of duty on the part of railway servants, it is desirable more frequently to put in force the penal provisions of Lord Seymour's Act, in order that the strictest discipline may be maintained. At the same time, this meeting considers it due to men, whose services are so arduous, to encourage the requisite discipline and obedience of orders by adequate remuneration, and by suitable rewards for extraordinary exertions or long-sustained good conduct.

"6. That the directors at this meeting assembled have taken into their serious consideration the expediency of placing on the engine a third man as conductor or captain, in addition to the engineman and fireman usually employed; and they are of opinion that such a measure, by distracting attention, dividing authority, and removing or diminishing the responsibility of the engineman, would increase rather than lessen the risk of accidents to the train.

"7. That this meeting considers it desirable that there should be a uniform system of signals recognised, and applicable to all railways; and they recommend that the following rules and regulations with this view be submitted to the consideration of each railway company."

TO CORRESPONDENTS.

"Captain B." *who writes from Manchester, is too zealous in his support of Mr. Stead's invention, to steer clear of libellous expressions. His communication would, moreover, be charged at the Stamp-office as an advertisement. He would perceive that we, last week, inserted an extract of a letter from Mr. Stead, on the subject, which will remove the effect of the previous statements.*

"W. M." *shall receive an answer per post.*

A strange blunder, for which we cannot satisfactorily account, occurred last week in the description of CAPTAIN E. J. CARPENTER'S *steam-boat propeller. The name of the inventor, though given correctly in the commencement of the description, is, in a subsequent part, called* "EDWARDS."

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of to-day.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 20 ARE NOW READY.

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THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, JANUARY 23, 1841.

Our Readers, with this number, will receive a Supplement,* gratis, *containing an Index of the Contents of the Third Volume of the* INVENTORS' ADVOCATE. *The three first volumes of the work, handsomely bound, may be had at the* INVENTORS' ADVOCATE *Office,* 198, *Strand.

The growing importance of railways, as a means of facilitating the communication between distant parts of the country, and as investments of capital, has induced the publication of a quarterly journal devoted to their consideration. Nothing can more strongly show the interest with which these undertakings are regarded, than the large space which is devoted to them by the periodical press, independently of those publications which are more exclusively confined to giving railway intelligence. Great as has been, and is, the utility of common roads and canals, their formation never excited any general interest which would have justified the publication of a periodical journal limited in its compass to the modes of construction, to the management, the meetings of trustees and proprietors, and the respective amounts of traffic of roads and canals. The principal sensation excited about road-making has been that caused by the system of Macadamising, which at the time did direct public attention to the subject; but no one, we believe, ever contemplated a *Road Times*, or a *Canal Magazine*, or a *Turnpike Quarterly Journal*. To railways is reserved the honor of having their periodicals; in which the meetings of the proprietors, the projections of new lines, the amount of traffic on those in work, the accidents, the mode of management, and mechanical arrangements are reported, stated, and discussed. The public mind is quite alive to the subject, not only on account of the immense amount of capital invested in those undertakings, but because they have introduced a degree of rapidity in locomotion, which almost realises the tales of fairy land; and they hold out the hope of still further improvements, that may approximate the most remote parts of the kingdom within a few hours of distance.

The publication of the *Railroad Quarterly Journal*, the first number of which is now before us, may be considered as additional evidence of the great and increasing interest these undertakings excite. We noticed the announcement of it with pleasure. We hoped to have found in a work that appears at such distant intervals well-considered views of the systems of railways and of railway management, free from personal abuse or vindictive feelings; that it would have afforded some scientific information connected with the working of locomotive engines, and the mechanical advantages of railways; but we regret to say that in these respects our expectations have been greatly disappointed. The greater portion of the present number is filled with a reprint of the reports of railway accidents which have occurred during the past year, to which are appended remarks; in the propriety of many of which we concur, but they are mingled with personal feeling, and written in a style which we did not expect to have seen in a work, which has not the circumstance of necessary haste in its production to offer as an excuse.

Among the plans for the avoidance of accidents, we are glad to find the *Quarterly Journal* recommending the appointment of conductors in addition to the engine-driver and stoker; though we fear that the addition of a conductor, unless he be a superior officer, as we recommend, who has the whole of the other persons employed under his command, would occasion the evils which the sub-committee of the Manchester and Liverpool Railway deprecate; viz., a mutual jealousy, and division of responsibility. The captain of the train ought to possess supreme control, and to be a person whose known judgment, ability, and good conduct, are the guarantees that he will exercise his powers with discretion, vigilance, and promptitude.

There is a question adverted to in the *Railroad Quarterly Journal*, to which we have before directed attention, that deserves the serious consideration of all railway managers; if indeed the time be not now gone by to avoid the evil which threatens them. The many serious accidents that have occurred on railways since the prorogation of Parliament, and the manner in which public attention has been directed to them, will, there is little doubt, induce the legislature to adopt some measures for the better security of passengers. We should regret if any reluctance on the part of the directors to adopt every precaution that may lessen the risk of accident, should render legislative interference necessary. The result of the conference of railway delegates will, we hope,

prove that no necessity of the kind exists, and that the directors, on a liberal view of what is to the advantage of the interests they represent, if actuated by no other motive, will concur in the adoption of more efficient cautionary measures to prevent collisions, or the accidents arising from obstructions on the line, or from the fracture of any part of the carriages or machinery.

Increased expenditure in the working of railways, if it prevent accidents, will be money well laid out, even in an economical view of the general interests of railway companies; whilst every precaution that can possibly be applied is what the public have a right to expect, and it is the duty of the directors to adopt.

Since the preceding observations were written, we have received the resolutions agreed to at the railway conference on Tuesday. An abridged report of the proceedings, extracted from the *Times*, of yesterday, will be found in another column. The guiding feeling which seems to have prevailed at the meeting, was to prevent the interference of the legislature in the management of railways, by agreeing to adopt measures that will render such a course unnecessary. The resolutions acknowledge the "grave responsibility which attaches to railway directors, and the obligation under which they lie to adopt all judicious and practicable expedients for ensuring the general accommodation, comfort, and safety of the passengers intrusted to their charge;" and, impressed with the importance of their duties, they have agreed to regulations with a view to fulfil them. We regret however, to find that they have decided against the appointment of captains of trains. We shall revert to the subject when we have seen the regulations adopted, and have a more full report of what occurred.

THE HARROW INQUEST.

It will be perceived by the report of what occurred in the Bail Court, on Monday, that a rule *nisi* has been granted, for setting aside the verdict of the coroner's jury at the Harrow inquest on the bodies of Simpson and Dawson, who were killed by a collision of two engines near the Harrow station of the London and Birmingham Railway. The ground on which the motion is founded, is the inconsistency of the verdict; which declares the engine-driver to have been the guilty party, and yet levies a deodand on the engine. A deodand, it is asserted, can only be levied in cases of *accident*.

As flagrant defects and monstrous absurdities exist in every department of the law, it cannot be expected that the obsolete law of deodand should be exempted from the general mass of inconsistency and perplexity. The principle on which the law of deodands depends would be equally applicable in case of felony as in case of accident. Whether it will be so determined by the law, remains to be seen—we strongly surmise that it will not. The deodand of £2,000 which is now attempted to be set aside, we have all along pronounced to be excessive, under the circumstances of the case; but we wish the question to be decided on its merits, and not to be got rid of by one of those quibbles of the law, which serve to show how the soundest principles may be made to give place to legal subtleties.

NEW INVENTIONS.

AN INSTRUMENT FOR MEASURING THE SLIGHTEST VARIATIONS IN ATMOSPHERIC PRESSURE.

(*Communicated by Mr. J. Goddard, of Bristol.*)

The fact that a small volume of air, being, in consequence of its almost perfect elasticity, extremely susceptible of indicating, by a proportionate change of bulk, the slightest variation in atmospherical pressure, led me to reflect, that, if any plan could be devised, to show a very minute expansion or contraction, consequent upon a small variation in the density of the atmosphere, such would prove useful, so far as the observation of the momentary oscillations of the barometrical column should be found interesting or valuable in the future investigations of atmospherical phenomena.

Impressed with this consideration, I determined on a series of experiments, the greater of which proved fallible. The most successful of these, however, fully answering the purpose I had in view, suggested to me the construction of an instrument, described as follows:—

To the base of a well-polished and varnished copper cylinder, closed at the top with a plate or disc of the same metal, having a capacity of about three cubic inches, is attached a ring of lead, of sufficient weight to render the whole, when filled with air, somewhat lighter than an equal bulk of distilled water; so that when the cylinder is immersed in a jar of water, its top shall float a little above the surface of the water. To the disc is secured a small perpendicular rod, parallel to the axis of the cylinder, and having a length of about six inches, being so graduated that each division shall have the value of one thousandth parf of the inch of the mercurial barometer. The diameter of this rod becomes a problem, when the scale has been previously determined on, for the solution of which the principal data to be taken into account are, the donsities of the water and rod respectively, and the length of the divisions determined on. The instrument, when immersed in a jar of distilled water; and adjusted by means of the addition of a number of small weights, until the cylinder floats a little below the surface, indicates, by rising or falling, the slightest variation in the density of the atmosphere, *rising when the barometer falls, and vice versâ*. It is evident that any change in temperature will equally affect its movements, and hence it will be found indispensable to use a differential thermometer for the necessary corrections for variations in temperature.

During the late stormy weather, I have had in action a similar instrument to the one above described. Its movements at such times are very distinctly observable, when entirely protected from the direct action. The passage of clouds also causes it to vibrate. Perhaps the best material for making the cylinder of would be glass, as that would not be in any way affected by contact with the water. I conceive that some modification of this instrument might be applied with advantage to mark any change in the elasticity of a portion of air confined in a close receiver, during the operation of any chemical experiment.

AMERICAN WATER-WHEEL.

A patent has been taken out in America for a water-wheel, with the title of "the direct inclined-plane re-action water-wheel." The buckets are in two tiers, placed between a middle and two outside plates; and there is, no doubt, novelty enough in the arrangement to justify the grant of a patent. The claim is to "the arrangement of the upper, middle, and lower plates, with direct action buckets between the middle and upper plates, with the inclined-plane and re-action buckets between the middle and lower plates, as described."

THE HYDRAULIC BELT, KNOWN IN 1783.

(*From the Liverpool Mercury.*)

We lately brought forward the subject of what is called Hall's Patent Hydraulic Belt, for raising water, a model of which is now exhibiting with great *éclat* at the Polytechnic Institution, London, as one of the most simple, ingenious, and useful discoveries of the age. When we first read the announcement of this machine, it occurred to us that we had many years since read or heard of something very similar, although our recollection on the subject was but imperfect. A correspondent, who styles himself *A Mechanic*, has subsequently put us on the right scent by directing our attention to the *Annual Register* for the year 1783, where we find this very hydraulic belt described, as we shall presently prove to our readers, by transcribing the whole of the article. Not only was the principle then discovered, or rather we should say announced, but it was applied to the raising of water from a depth of two hundred feet, the only difference between that experiment and Mr. Hall's being the substitution by the latter of a woollen band instead of a rope.

[FROM THE ANNUAL REGISTER FOR THE YEAR 1783, P. 87.]

"*A short Account of the Machine lately erected, by command of his Majesty, at Windsor, for raising water out of a very deep Well to supply the Castle.*"

"This machine is said to be the invention of a seafaring man (we wish we could record his name) who took the hint from observing the great quantity of water which every rope brought on board with it that had been drawn through the water, a circumstance that could escape no person's observation who has been much on board ships; but which, like many other things that pass daily before our eyes, had never been applied to any useful purpose. The application is as simple as the principle.

A grooved wheel, about three feet diameter, is fixed upon an axis, which turns horizontally over the well, and an endless rope, of a sufficient length to reach into the water in the well, passes over it in the groove. On the same axis a winch is fixed at one end to turn it by; and, at the other end, another wheel, loaded with lead, which acts as a fly, to increase the velocity. On turning the wheel, each part of the rope, as it comes to the bottom, passes through the water, and, on account of the above-mentioned property, the water adheres to, and is brought up by it to the top, where it is discharged from the rope into a cistern, placed to receive it, by the pressure of the rope upon the wheel in passing over it. And so great is the simplicity and effect of this machine that we have been told by a very excellent mechanic, who has seen it, that notwithstanding the well is near 200 feet deep, he turned the machine with one hand, so as to raise water sufficient to fill a pipe, the diameter of the aperture of which appeared to him equal to the diameter of the rope that raised it. This, at least, is certain; the well had been long disused before this machine was erected over it, on account of the difficulty they found in raising the water out of it."

ON A PRINCIPLE OF FENCING, FORMED ACCORDING TO THE LAWS OF VEGETABLE PHYSIOLOGY.

At a recent meeting of the Botanical Society of London, the following account was given by Mr. Daniel Cooper, the curator, of a mode of forming a fence-work to plantations, &c., of a very economical and rustic kind, and which may be termed with all propriety a "*Natural living Fence*." We are induced to give a full abstract of the communication, (from the first part of the Society's Proceedings), as we think the suggestion might offer some points of interest to our country readers.

The natural living fence consists simply of planting for the purpose trees or shoots of the same species, or species of the same genus, or genera of the same natural family, and causing them to unite by means of the process of "*grafting by approach or inarching*," a process well understood by gardeners and horticulturists. The fact having been briefly stated, it is necessary, in the next place, to enter more fully into an explanation of the plan to be adopted. In the first instance it is requisite te cultivate a portion of land, for the purpose of rearing the shoots intended for forming the fence. Those which I had the opportunity of observing (on the estate of Sir Thomas Neaves, Dagnam Park, Essex, constructed by his gardener and planter Mr. Breese), were formed of ash, but of course any other tree would similarly unite and answer the end required. The faster the tree grows, and produces new wood,

the stronger and better the fence necessarily becomes. The shoots or small trees are run up (as termed by gardeners), and kept trimmed so as to produce stems as straight as possible. These are trained to the height required, depending upon the intended height of the fence. As soon as they have acquired sufficient age they are carefully transplanted, a trench of two feet in width being previously made in the line of the intended fence, it being found necessary to surround the roots with earth of a richer nature than that usually met with, where fences are to be placed, such as the outskirts of woods, plantations, parks, &c. The trench having been made and prepared, the stems are then carefully removed; one set being planted at the required distance, a foot for instance from each other, those we may suppose to slope to the north; the other set, for example, are planted sloping towards the south, at the same distance from each other, so that when the shoots proceed from the ground, they are in contact by their internal part.

The several stems having been thus arranged, the next and most important step is that of causing them to unite; this of course is requisite in order to produce strength, and is accomplished by the process of *grafting by approach*, or, what is the same thing, that of *inarching*. For this purpose it is necessary to remove a small plate of bark at the proper season, on each stem where their inner portions are in contact; this having been carefully performed, approximate the two stems, so that the denuded portions of each shall exactly meet; tie the stems together at these places, and keep them for a short time from the action of the atmosphere by means of a piece of clay. In the course of a few weeks, if these precautions have been attended to, adhesion takes place, and the result is, that a natural living fence has been formed, having openings of a diamond shape, which may be made of course of any size that may be required; it being only requisite to place the stems in the earth at a greater or less distance from each other.

The adhesion takes place in the following manner according to the laws of vegetable physiology. The plates of bark being removed on each stem, and the stems approximated to each other at that part, it follows that as the fluids rise in the stems of exogenous (outgrowing) trees, within the woody portion of the trunk and descend within the bark, —that the stems being closely tied to each other, and kept at their point of union from the action of the air, the *cambium* (proper or elaborate juice) exudes, forms new wood, and the stems unite by the natural process.

The advantages which Mr. Cooper considers this kind of fencing to possess over that in ordinary use, are the following:—

1st. That it is rustic, and has not the hard and stiff appearance of the fencing made by carpenters.

2d. That so long as the trees of which it is formed are alive, it never requires to be in any way repaired, as living wood resists the action of the weather. The young shoots, should any spring forth, are to be removed by the pruning knife.

3d. That it may be carried to any height without additional expense, by training or running up the stems to the required height.

4th. That it acquires strength and thickness by the deposition of new wood annually; so, that in the course of years, when the stems have acquired the greatest degree of thickness, and have obliterated the openings, in the first instance made, a complete solid living wooden wall will be the result.

5th. That owing to the well-known durability and power of resisting the action of the weather of the bark, and external portions of living trees, a fence made on this plan does not require to be covered with tar, or any other preparations, requiring much time, labor, expense, and annoyance in the operation.

6th. That the first expense is the last, and is much cheaper also, in the first instance, to the ordinary kind of fencing employed, not requiring an annual expenditure to keep it in order; living wood, as before observed, withstanding the effects of the weather to a much greater extent than dead wood.

7th. That a fence to orchards may be formed of fruit trees of the same genus, or in the same natural family; the lower portions or stems of which form the fence, (and may be carried, as before observed, to the requisite height), whilst the upper part may be allowed to send forth its shoots and bear fruit.

8th. That owing to the open nature of this kind of fence (which openings may be formed of any size), shrubs and other plants usually planted close up to fencework, for the purpose of concealing it, will receive a larger proportion of air and light, so necessary to the growth of vegetables, which cannot be the case with the ordinary method of enclosing parks, &c., with palings.

9th. That should one of the bars by any cause become dead or destroyed, the circulation is carried on by the contiguous bar or stem; so that if a bar dies it still remains in its situation, although it does not increase in thickness as takes place in those around it; this dead bar may then be compared as to durability to the fencing until the present time formed of dead wood.

From the well-known nature and structure of wood, I consider the application of the process of *grafting by approach*, or *inarching*, in the construction of fences of all descriptions, to be one of the leading improvements of late years made in the science of gardening; and as such should strongly recommend its adoption to those individuals possessing landed property, and also to the directors of railroads and other undertakings, where both man and cattle are intended to be kept off, and which might more effectually be accomplished by the judicious selection of stems armed with prickles, &c.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING JANUARY 25, 1841.

Monday,	Geographical Society	9	P.M.
	Entomological Society (Anniversary)	8	P.M.
	British Architects	8	P.M.
	Medical Society	8	P.M.
Tuesday,	Medico-Chirurgical Society	8½	P.M.
	Zoological Society	8½	P.M.
	Architectural Society	8	P.M.
	Royal Botanic Society	8	P.M.
Wednesday,	Society of Arts	7½	P.M.
	Microscopical Society	8	P.M.
	Medico-Botanical Society	8	P.M.
Thursday,	Royal Society	8½	P.M.
	Society of Antiquaries	8	P.M.
Friday,	Royal Institution	8½	P.M.
Saturday,	Westminster Medical Society	8	P.M.
	Mathematical Society	8	P.M.

MEDICO-BOTANICAL SOCIETY.

Jan. 13. W. T. Iliff, Esq., F.L.S., in the Chair.

A paper was read by Dr. F. Farre, being the first of a series he intended to bring before the society, "On the various kinds of Aloes" used in Medicine, containing, with other matter, original information on the source of drugs, chiefly obtained by the assistance of brokers' agents, and other individuals connected with the trade.

The word *Aloes* is derived from the Syrian *Alwai*. It is chiefly obtained from the *Aloes vulgaris*, *A. rubescens*, *A. spicata*, *A. Socotrina*, and *A. arborescens*.

When it is required to collect the aloes of commerce, the leaves of the plant are cut, and the juice or sap is collected, pressed, and dried in the sun. He entered into the various kinds found in the market, and enumerated the *Barbadoes*, the *Cape*, the *Socotrine*, and the *Hepatic*. The *Barbadoes* fetches the highest price; this kind is given to horses, and forms a large proportion of the medicine usually given to those animals. The *Hepatic*, however, is that generally employed by the physician; but the *Socotrine* is considered to be the best kind; it grows on the limestone rocks of the Island of Socotra; the quantity annually prepared does not exceed two tons weight. Melinda and Madagascar are the sources from whence the market is principally supplied. The *Hepatic* kind comes likewise from the same places.

It is assumed that the appearance of the different kinds of aloes is dependent on the mode of preparation, rather than the difference occasioned by the produce of varieties of plants, and that owing to the very variable color and character of the Barbadoes variety, a gentleman, some years since, took out a steam engine in order to prepare it in a uniform state and quality. The prejudice of the dealers is, however, in favor of the old method of preparing it, although the new process is far superior.

The following gentlemen were nominated by the council to fill the post of officers for the ensuing year, who were duly elected at the anniversary meeting on Saturday last:—Earl Stanhope, *President;* Henry Cope, Esq., jun., *Treasurer;* William Henry Judd, Esq., and Edwin Saunders, Esq., *Secretaries;* James Yearsley, Esq., *Librarian;* Frederick John Farre, M.D., *Conservator;* Charles Johnson, Esq., *Professor of Botany;* Thomas Everitt, Esq., *Professor of Chemistry;* George G. Sigmond, M.D., *Professor of Materia Medica;* William Tiffin Iliff, Esq., *Professor of Toxicology.*

BOTANICAL SOCIETY OF LONDON.

Jan. 15. J. E. Gray, Esq., F. R. S., &c. President, in the Chair.

Specimens of *Lagurus ovatus*, from near Saffron Walden, Essex, collected by Mr. Cummings, gardener to Lord Braybrooke, together with a parcel of plants of rarity, were presented by the collector. The above-named grass has not hitherto been found in England; British botanists obtaining their specimens from Guensey and Jersey. There is no doubt as to its being native in the spot where it is found in Essex, and not introduced, as is generally supposed; it occurs in great abundance in that situation.

A note was read by Mr. Daniel Cooper "On the structure of the Pappus or Seed-down of *Cnicus heterophyllus*" (a species of thistle). If the seed-down be examined under the microscope with a quarter of an inch (Powell's) object glass, the primary *seta* (of which there are many) will be found to be exclusively composed of a number of elongated cells of cellular tissue, arranged in a longitudinal direction side by side; the interior of which are marked with numerous irregular-shaped dots, which are also to be seen in the small *filaments* given off on either side. From repeated examination Mr. Cooper is convinced that these little *filaments* which give the character to what is termed the *plumose pappus*, are nothing more than the lateral cells of the primary seta, which have separated from the great faciculus of cells which constitute that seta; for, at the extremity may be observed the acuminated ends of two or three cells only, while the whole organ gradually tapers from the base to the apex in the exact ratio of the number of filaments given off from its sides.

A paper was also read by Mr. Hewett Cottrell Watson, V. P., "On the Geographical Distribution of Plants in Britain." Mr. W. has for many years paid considerable attention to this subject, and the object of the paper on this occasion was to offer to the society his plan for working out, to a greater extent than is naturally conceived to be possible, the distribution of native species in so limited an area as Great Britain. The British Association has already granted a sum of money for the purpose of causing maps and charts to be engraved to carry out the project, which, under the care of Mr. Brand of Edinburgh, have just appeared. It was with a view to point out the inefficiency of these maps that Mr. Watson raised the numerous objections. He considered the principle good, and admired the scheme, although the method of working it was not in his opinion likely to avail science. The plan proposed by Mr. W. is to exhibit the different degrees of elevation of country on the maps by means of colored dots or spots—thus, a *black* spot indicated a hill or

mountain of 3,000 feet; a red one that of 2,000 feet, &c. In Mr. Brand's map there is no means of ascertaining the elevation of surface. All Mr. B. has done is to mark out the British Isles into 42 divisions or county limits, from each of which he is desirous of obtaining specimens; but the object he would obtain by this means would simply illustrate the county limits of plants, and not their geographical boundaries. Mr. Watson takes a map, and marks off with green spots as near as practicable the situations where certain plants termed *Alpine* have been found in England; thus he illustrates the peculiar ranges which belong to such Alpine plants, and shows the tract of country over which they are distributed, and by this means exhibits the actual vegetation. The principal objection which Mr. Watson urged against the system adopted by Mr. Brand was —"it does not represent nature."

In a few remarks which Mr. W. made on local Floras, he proposed to the society the necessity, if practicable, of inducing the corresponding members to undertake to collect a complete series of wild specimens to be found within a distance of three or four miles of their residences; to fasten the dried specimens on paper, and bind the plants of each district in a volume, affixing an appendix, for the purpose of containing species gathered beyond the district. These, he stated, would be most desirable for the society to possess, as they would be far superior to any lists that might be furnished, as there could then be no mistake as to the species enumerated. The plan met with the general approbation of the members, and steps will be taken to put the same in execution in the course of the next spring.

It was stated that the *perforated zinc* plates had been found very serviceable in drying succulent plants, by introducing them between the sheets of drying paper; the usual plan is to dry the plants by heat, either in an oven or by hot irons. The use of the hot iron is very common in Switzerland by botanists. In those plants containing much starch, they are effectually dried by the interposition of the zinc plates; for ordinary plants, however, it was stated to be bad, as it makes them too crisp, resembling tea.

LINNEAN SOCIETY.

Jan. 19. *Edward Forster, Esq., F. R. S., V. P., in the Chair.*

John Machlallan, Esq., was elected a Fellow, and Mr. Frederick Westcott of Birmingham, an Associate. Mr. Mann exhibited a specimen of *Sedum Telephium* (stone crop), which, although it had been gathered and preserved in a dry state in his herbarium for two years, even now exhibited signs of vitality by the protrusion of root-like processes, a circumstance by no means uncommon with this tribe. Mr. Babington placed on the table some *fir cones* he had recently obtained, and which were taken about ten feet below solid peat at Barrishooke, near Newport, county Mayo, accompanied by nuts of the hazel (*Corylus Avellana.*) It was stated in the note that the trees in that part of Ireland have been destroyed for above 200 years, and no individuals of either of these kinds are now to be found within a very many miles, except a few recently planted, which are distant from the locality where they were found. A description of a new genus of plants allied to the *Malvaceæ* mallow tribe was read, received from Mr. Babington; also some interesting extracts from letters addressed to Mr. R. H. Solly, by Mr. W. Griffiths, surgeon in the E. I. Company's army, containing observations relating to botanical science. The first extract included observations on the impregnation of ferns—in this note he goes so far even as to assert, that there are male organs in ferns—which conclusion he arrives at after much investigation; he is of opinion that the peculiar hair-like bodies, which he has attentively examined, act the part of *Anthers;* and he trusts to be able to show at some future time presumptive evidence for this assertion.

He also made some remarks on the impregnation of *Orchideæ*, and on a plant nearly allied to *Galium*. He has verified the statement he brought forward in his paper published in the Linnean Society's Transactions, with regard to the development of the ovule in *Viscum*, and states that the views entertained by Brogniart with respect to *Zea Mays* (Indian corn) are decidedly wrong. On his arrival at Calcutta it is his intention to work on the *Rhizantheæ*, and to determine the specimen of *Rafflesia* he has collected.

Some notice was also made on the genus *Lonicera* (Honeysuckle): in some of the flowers of which he observed a monstrosity in the pistil, which inclines him to consider the integuments of the seed to be metamorphosed leaves. He had also noticed on his travels a plant very much allied to *Chara*, and which he thinks would show the circulation of the sap well, as it is not incrusted.

The ninth part of the Proceedings was announced as ready for delivery to the Fellows. The meeting then adjourned to Feb. 2.

HORTICULTURAL SOCIETY.

The first ordinary meeting for the present year was held on Wednesday afternoon, Dr. Henderson, V.P., in the chair. Numerous presents were announced, amongst which was the last number of the "Flora Batava," from the ex-King of Holland. The show of fruit was very interesting, and amongst the most prominent was a collection from the gardens of the Duke of Portland, at Welbeck, in Nottinghamshire. Amongst these there were some fine fruits of citrons, shaddocks, oranges, and lemons, as well as a dish of the purple guava, which was considered one of the richest delicacies of the dessert at Welbeck Abbey. This fruit, although held in high estimation, is not much met with, which was principally to be ascribed to the fact that the new trees are raised by seed instead of from the old productive stock, which is always successful. Amongst other novelties in fruit from contributors was a dish of the passiflora edulis from Mr. Martineau, of Basing Park; and a Chinese fruit, called the stoneless litchi, from Mr. Reeves, of Canton, which had been kept for some years. From the gardens of the society there were many new choice varieties of fruit, the pears being the Easter beurré and beurré ranee; rouse leuch, one of the latest of the introduction of the late President; Princes Saint Germain, a new American variety; and passe colmar. The apples were Pearson's peate, Braddick nonpareil, old and white nonpareils, Æsopus Spitzberg, Boston russet, remette du Canada, Baxter's pearmain, Beachamwell, Pennington's seedling, and Bedfordshire foundling. There was also a plate of fine black Hamburgh grapes from the gardens of Lord Sondes, in Norfolk, from a tree planted in 1839. The show of flowers was very good, a collection from Mrs. Lawrence, of Ealing Park, standing richly conspicuous, including brassia maculata, euphorbia, jacquiniflora, and other epiphytes, with magnificent clusters of flowers in high perfection. From Alderman Copeland's collection at Layton there was a new and rich epacris; and Mr. Lowe, of Clifton, exhibited other plants of the same class. Mr. Bateman exhibited two rich orchidaceous plants; and from Mr. Jackson, of Kington, was a collection of heath in good bloom. The prizes awarded were silver Knightian medals to Mr. Tillery, gardener to the Duke of Portland, for fruit; Mrs. Lawrence for her fine specimens; and Mr. Bateman for two new orchidaceous plants. The meteorological register kept at the gardens since the last meeting, from December 7 to January 19, gave—barometer, highest 27th Dec. 30,614 inch, lowest 11th January 28,861 inch., making a range within a fortnight of $1\frac{3}{4}$ inches. Thermometer, highest 1st December 56 F.; lowest 7th and 8th January 6. F.; and quantity of rain 2.68 inches. Sir Frederick Pollock, M.P., was admitted a Fellow, and the meeting adjourned to February 2.

OBSERVATIONS ON WHITE RAINBOWS,

BY DR. WILKINSON, OF BATH.

In consequence of this optical phenomenon having been lately observed, and stated as being indicative of great cold and storms, I take the liberty of submitting to the public some opinions as to the cause by which these phenomena are produced.

I have never seen recorded any account of a solar rainbow being formed of white light. I believe all that have been seen are the result of light reflected from the moon. From the principles already laid down, it is evident that a rainbow may be formed by an artificial shower from a fountain, and a good lamp light, properly adjusted as to the eye; thus a lunar rainbow is produced in the same manner as a solar, but necessarily more faint from the reflected condition of the light from the moon's surface. Many lunar rainbows have been seen with only one or two colors, instances of which have been recorded by Mr. Duval, in 1748. Don Ulloa, when on the top of the Andes, saw a white rainbow. Such rainbows have been considered as harbingers of stormy weather, a supposition which appears to be well supported. In the Philosophical Transactions for the year 1782, three white lunar rainbows are recorded, and that year was particularly stormy; also in the year 1819 three lunar rainbows were observed, two of them having the usual colored range; but the third was followed by remarkably boisterous weather, exceeding in violence any storm which had occurred for many years.

At a meeting of the British Association, in 1837, M. de la Rive, of Geneva, described a very curious phenomenon presented by Mont Blanc after sunset, which consisted in the re-appearance of the red color of the snow, produced by the rays of the setting sun. Our learned countryman, Mr. Lubbock, considered this phenomenon as a necessary consequence of M. Poisson's laws of equilibrium of elastic fluids, that the atmosphere of the earth at a certain height becomes liquefied. In this way the atmosphere receives an abrupt termination, by which any considerable resistance to cometary or planetary movement would be prevented. If such a supposition be admitted, we may conceive that an alteration in the temperature of the upper part of the atmosphere might be so intense as to induce almost a solid change, and that the transparency might be so diminished that only light would be reflected from the outer surface, and suffering no refractions a white bow would be the result. If such a change in the constituent parts of the atmosphere should occur, it may be easily conceived that in the subsequent equalisation of temperature such stormy weather as has been described might be the result; for the halos, which are so frequently observed, have been supposed by Marriotte, Newton, and Dr. Young, to be produced by refraction in floating hail or snow, as at the instant of change before they unite and form the flakes, they then exist as small equilateral prisms, optically favorable for such a result.—*Bath Journal.*

REASONS FOR FAVORABLE AND COMMERCIAL PROSPECTS.

With respect to general commerce connected with manufactures we can now only briefly state that our favorable impressions arise from these causes principally—1. That most of the raw materials of manufactures are held at low prices. 2. The stocks of goods in foreign markets are not large, and they are, generally speaking, laid in at unusually low rates, which must act favorably for the exporters in realising sales. 3. The manufactures of the Continent have been paralysed by numerous bankruptcies—twelve principal firms in the single town of Magdeburg—and cannot enter into successful competition with those of England for want of confidence and power—especially in the spinning departments. 4.

Our great customers in the United States manifest a power and a willingness to buy; the last packet-ship left Liverpool with a freight of £1,800, whereas many of the preceding vessels of the same class went out of dock with £500, £600, or £700, freight. We anticipate that this power will continue at least equal to what it is at present. 5. The Australian colonies have been crippled by scarcity of provisions, and enormous high prices of the necessaries of life; the West India colonies by deficient produce; and the Canadian, by deranged currency and political disturbances. The force of all these untoward influences is lessening, and these colonies will have more power to consume manufactures. 6. The plantations of sugar, cotton, and indigo in the East Indies, are, we believe, in a thriving prosperous state, and the various markets in that quarter may be expected to continue good. 7. China. If our ministers do not neglect the commerce of England, as Lord Castlereagh did at the general peace, there will be an opening for British trade in this quarter of an extraordinary, we might say, of an unprecedented character. One of our missionaries, who speaks the Chinese language, and has lived many years in the country, reports that he saw above four hundred vessels employed in the coasting trade on the north-eastern shores of China, of from 200 to 500 tons burthen each. The carriage of tea from the province in the north, where it is produced, to Canton in the south, for the convenience of delivery to the English, costs 600,000 dollars annually. Nearly all this may be saved by our having a settlement at Chusan; and the interchange of commodities may be exceedingly increased from that centre. We have no hesitation in saying that it is quite possible for our trade with China, within a short term of years, to be increased in a more rapid progression than that which marks the decennial augmentation of our trade with the United States.—*Circular to Bankers.*

SCIENTIFIC MEMORANDA, AND NOTES ON ART.

On the Formation of Coal.—The small extent of coal in many countries is merely a fact indicative of the previous revolutions which affected the primary strata there; while the abundance of coal in Great Britain confirms to us the conclusion drawn from other considerations, that in this region of the globe, soon after the formation of primary strata, much land had been raised above the sea. But there is yet to be explained the excessive abundance of the vegetation of that early land, which should be capable, even when swept down into estuaries and the sea, of collecting into so enormous a mass of coal. On this point, if we turn our eyes on existing nature, nothing appears so likely to aid our conception as the damp forests on the Oronoko, Maranon, or Mississippi, from whose mere waste the mighty rivers roll every year to the Atlantic, an immeasurable mass of trees and herbs, with soil, sand, and clay, which are in process of time arranged on the bed of the ocean, as we find the coal and its accompanying sands and clays to be. The analogy is strengthened by the general consent of botanists, in regarding the plants of which coal was formed to be decidedly analogous (though differing much) to tropical vegetation, and especially to the vegetation of a tropical region contiguous to the sea, where *Palms, Cactaceæ*, and *Lycopodiaceæ* might abound, and yet varied with mountain slopes on which tree ferns and pines might flourish. If further we supposed with M. Brogniart, that the atmosphere of that early time might be loaded with an extra portion of carbonic acid, against which no law of nature militates, (for we know not if this proportion of carbonic acid be now constant in the air, and must admit that a reconversion of all the coal to carbonic acid gas, *would* give a very large addition of this gas to the atmosphere,) we shall understand how the vegetation of the carboniferous period might be *even more abundant than that now seen between the tropics*, and at the same time comprehend the *possibility of there being no land animal on the globe*. Within what limits of proportion of carbonic acid in the air plants and animals can live, we do not know; but in this respect they are reciprocally circumstanced,—plants require most,—animals require least.—*Phillips's Treatise on Geology, vol. I.*

On the Adulteration of Carmine.—Ehrenberg, in Poggendorf's *Annales*, states that there occurs in commerce a kind of very fine colored and very expensive carmine in the form of cakes, which owes its fine color to an adulteration. Upon being made use of for ordinary painting no difference has been observed, but by the microscope it may be discovered that half of it consists of starch (*wheat starch*), which imparts to the finely divided carmine a clear ground and a brilliancy highly increasing the appearance of the color. When such carmine is mixed with much water, it diffuses itself throughout, and is for a long time suspended; but upon pouring off the water, a white sediment remains similar to white lead. This sediment is starch. Besides this distinct form and size of an amylaceous body, when it is examined by its reaction upon tincture of sodium, it produces the well-known blue color. This sediment when heated with water forms a paste. The addition of white lead is detected by its weight, but the addition of starch is not so easily discovered; by means of the microscope the adulteration may be with certainty recognised, and confirmed by chemical examination. It may be perhaps interesting for the artist to know, that few colors of this description mixed with an organic body, although generally pretty permanent, in a damp atmosphere are very liable to decomposition. In regard to its covering properties, starch differs considerably from white lead. It covers less on account of its transparency.—*Lond. and Edin. Philosophical Magazine.*

Method of obtaining correct Representations of Feathers.—Mr. Chambers, F.L.S., effected this, most perfectly, by placing the feathers between two sheets of paper, the lower one being previously well damped, and the upper covered with printers' ink; both are to be passed through the rolling press of a copper-plate printer, and on removing the upper sheet perfect figures of the feathers will be left, which may be colored when dry, and will then have the resemblance of feathers placed on paper.

The Vultur Aura.—Mr. Sells states that this bird is found in great abundance in the island of Jamaica, where it is known by the name of *John Crow*; and so valuable are its services in the removal of carrion and animal filth, that the legislature have imposed a fine of £5 upon any one destroying it within a stated distance of the principal towns. Its ordinary food is carrion; but when hard pressed with hunger it will seize upon young fowls, rats, and snakes. After noticing the highly offensive odor emitted from the eggs when broken, Mr. Sells related instances which had come under his observation, for the purpose of proving that this *Vulture* possesses the sense of smell in a very acute degree.—*Proc. Zool. Soc. Lond.*

On the Immortality of Plants.—Professor Meyen in his yearly report "on the progress of Vegetable Physiology, for the year 1837," gives the following abstract and remarks on a memoir, by Dr. Von Martius, of Munich, which treats of the immortality of plants. The idea of the immortality of plants is the next step to the proof of the existence of a vegetable soul; but Von Martius himself observes in the introduction, that it is true that many scientific men, *to whom the power of comprehending the transcendental has been imparted in a lower degree*, will regard the consideration of such a subject a digression; he, however, believes that the greater part of mankind are so organized, that they will adopt conclusions, and acquiesce in consequences, which rise above the world of sensible contemplations and perceptions into the higher world of the spirit. The conviction of the immortality of plants can, however, in no case be deduced from any proof derived from the nature of plants; but it must be peculiarly the *conception of the individual mind*. "In the corporeal life of the plant then exist intention, tendency, and means for their attainment; nay, we even see this controlled by the fitness of time, in the same way as in more highly endowed man. The plant, like the animal, has inward intentions to fulfil outwardly, fulfils them like the latter, and indeed in the same way, more or less perfectly, according to the various conditions of which they consist. There is, therefore, only a difference of degree between the unknown unity which predominates over all this activity, and which in man is termed his soul, and the spontaneous power analogous to this soul which the plant exhibits in action during its whole life," &c. We do, therefore, an injustice to the plant when we consider it as not being like the animal endowed with a common primary force, penetrating through all parts, and directing them all to certain actions. From these views, however, it would result that all inorganic bodies are also endowed with a soul, a thought, which has been already asserted in the most ancient times; nay, Von Martius arrives at the conclusion, that every thing earthly, and therefore also the plants, possesses a soul, and the numberless fraternity of similar creatures which act so prominent a part in the universal life of our planet, are, according to their scale, governed by a soft peaceful spirit, an *Anima blandula, trepidula.*

Parasitic Worm in the Eye of the Horse.—In Silliman's Journal the circumstance is related of which the following is an abstract and condensed account. During the past year a horse was exhibited in New York, in the right eye of which was contained a *vermiform animal*, floating in the anterior chamber, between the cornea and the iris. When first discovered it was only half an inch long, and in a few months measured about 4 inches; it resembled a portion of white thread or bobbin, with an enlargement at one extremity of half an inch or more in extent. The animal is confined exclusively to the anterior chamber of the eye, in which it swims with the greatest ease and activity, doubling itself in every direction, and performing the most rapid evolutions. It seems remarkable that it should not pass through the aperture of the iris into the posterior chamber. Its movements do not appear to excite any sensation in the horse, although a milky cloudness in the aqueous humor somewhat dims the vision of the eye in which it floats. This discoloration is believed by Mr. Cramp, the owner of the horse, to be owing to the *excretions* of the parasite, which he says are evacuated about once in three weeks, when the eye appears much more clouded than at other times. Others have assigned different causes which would produce this opacity. Owing to the incessant and rapid motion of the worm it was difficult to examine it with a microscope, yet it could be sufficiently well seen to detect that it belonged to the class *Entozoa*, order *Nematoidea*, genus *Filaria*, and species *Papillosa*. Such objects are by no means uncommon in the eyes of horses in the East Indies; and they have been seen at Vienna, Lyons, &c. By the leading physiologists of modern times, including Muller, the origin of intestinal and visceral worms is due to *spontaneous generation*. Ehrenberg believes that the eggs of intestinal worms are taken into the circulation and carried by that means to all parts of the body, but are developed only where the particular conditions requisite for this purpose are favorable.

New Russian Scientific Journal.—It is announced that this year a Russian Journal will appear, entitled the *Russian Courier*, which will be devoted to national literature, to history, and to the arts and sciences. This Journal, published by M. Glinke, will, on the first day of each month, appear on a large sheet containing thirty pages.

Spitalfields School of Practical Design.—On Monday a meeting of some of the most eminent of the silk-manufacturers, and of the most skilful of the journeymen silkweavers, was held for the purpose of "appointing a committee to superintend the school of design which is about to be established in Spitalfields." There were present Messrs. Gibson, Soper, Robinson, Harrison, &c., silk-manufacturers, and eighteen of the committee of journeymen, who have united for the purpose of forming a pictorial and emblematical specimen of the art of silk weaving, which is to be offered for her Majesty's acceptance, and which will cost many hundreds of pounds. Mr. Ballance, silk-manufacturer, presided. The Rev. Henry Taylor stated that it was most necessary that there should be a co-operation of the manufacturers and journeymen to promote the object of a school of design. The Government had promised their assistance, provided such union took place, or that a committee was formed, consisting of both manufacturers and journeymen. A prolonged conversation ensued as to the most advantageous mode of carrying out the intention of forming the school, in the course of which the manufacturers acknowledged the great credit due to the journeymen for their exertions in the establishment of such an object; and it was stated that the funds for the support of the school would be in part granted by the council of the central school of Somerset House. Mr. Robinson then moved the following resolution:—"That in the opinion of this meeting it is highly expedient to establish a school of design in this neighbourhood, to co-operate with the central school at Somerset House; and that a committee, consisting of manufacturers and journeymen, be formed to carry the object into effect." This was carried unanimously. The committee was next formed, consisting of ten manufacturers and ten journeymen. At the conclusion of the proceedings the pictorial and emblematical design, which is intended to be formed into a piece of workmanship entirely of silk, was exhibited. In it are represented her Majesty seated, and Prince Albert standing on her right. The profiles of Nelson, Howe, Wellington, Moore, &c. &c., were on each side of the picture. The design was admired by the manufacturers present; and it was observed by one, that, when finished, it would astonish the silk-manufacturers of Lyons.

Coloring Cheese.—Dr. Holland, in his "View of the Agriculture of Cheshire," published in 1808, asserts that upwards of £10,000 went annually out of the county for the purchase of the drug annatto, which is the principal material employed in the coloring of cheese, and there is no reason for supposing that the amount is less in the present day. If it could be shown that this sum is not only thrown away, but that it is the very means by which cheese is deteriorated and disgraced in the estimation of the public, it is high time that some steps should be taken to persuade the cheese-eaters of the metropolis and others how absurd it is to prefer this worse than useless embellishment to the natural beauty of a real well-made Cheshire cheese. There are farmers who remember the day when no coloring whatever was used in the dairy.

Economy of Food.—The Royal Agricultural Society of England has offered a prize of ten sovereigns, or a piece of plate of that value, for the best directions to enable laborers to prepare wholesome, nutritious, and palatable food, in the most economical and easy manner. As the object of the society in offering this prize is to procure such instructions for agricultural laborers to supply themselves with the greatest quantity of nutriment which the means at their command will produce, and to prepare a warm, comfortable, and nutritious meal for themselves and their families, when they return from their day's work, the competitors for it are requested to observe—1st. That the receipts must be given in as plain a manner as may render them available to the laborer or his wife, who are unaccustomed to cookery. 2d. That the receipts must be such as may be used without requiring any apparatus which any agricultural laborer does not usually possess. 3d. That they shall not require the use of ingredients which he may not easily procure, either from his garden or in agricultural villages. (This condition is not intended to preclude the recommendation of fish as a part of any dish.) 4th. The cost of the different dishes must be accurately stated.

Patent Pneumatic Marine Preserver.—A lecture was lately delivered by Mr. J. R. Bakewell, C. E., at the United Service Institution, in Scotland-yard, on a new invention of his for preventing vessels from foundering at sea, and also on some other new inventions of great general interest. The lecture was very numerously attended. Mr. Bakewell explained the mode of application of air for keeping vessels afloat, and went into various calculations; after which, he proved by experiments upon a small model, that vessels, with their cargoes, might be kept afloat when water-logged by means of the patent apparatus. He also proved, that any vessel could be raised, if at all possible to be got at, with her cargo safe. The lecturer next explained the principle of Rangeley's Patent Safety Railway, and entered into cal-

culations as to the power required to work a line of railway upon that principle, with the expense per mile, from which it appeared that much less capital would be required, and that there would be an annual saving of about 70 per cent. in the repairs of such line of road, and the carriages could ascend and descend an elevation equal to Holborn Hill (which is one in fourteen). Mr. Bakewell concluded by introducing a new instrument, called the "Ortho-Chronograph," for supplying the place of the transit at one quarter the expense. The lecture appeared to give much satisfaction to the members of the institution and their friends, many of whom remained in the room a considerable time after it had concluded examining the models and trying experiments in sinking and raising the vessel. We understand the model of the marine preserver is removed to the Polytechnic Institution, where it will be sunk and raised at pleasure.

Fall of a Warehouse.—On Tuesday the Inhabitants of the Navigation-road, Burslem, were thrown into the greatest consternation by the floor of the biscuit warehouse of Mr. George Hood, potter, suddenly giving way, and falling with a tremendous crash upon about 20 persons, who were at work underneath. There were from eight to ten tons of ware stocking at the time of the accident. The greatest anxiety prevailed, and every one present made a simultaneous rush to the rescue of the sufferers. The dense mass was removed in a shorter time than could have been expected. They all escaped injury, except three young women who were seriously hurt.—*Wolverhampton Chronicle.*

VARIETIES.

Umbrella Manufacture in France.—There is in France no manufactory where the umbrella is made in all its parts. It is not the less an important branch of industry, the produce of which annually exceeds 15,000,000 francs, but it is a scattered industry, wherein a great division of labor prevails. The several parts are each made by a special workman, and then put together and finished in some large establishments which supply the retail trade and export them. Thus every contributor to the umbrella works at home, at his or her hours. Rue Grenctat, the Passage de la Trinité, and Cour St. Martin swarm with workmen in the umbrella line; there is not a house where one does not find five or six families living by it. An interesting variety of those *industriels* bears the fearful denomination of *carcassiers*; it is they who put together and adapt all the pieces, and thus supply the frame-work which is to be ultimately covered; all the *carcassiers* are from Auvergne; all are from the same canton, most of them being uncles, nephews, and cousins. It is a pleasure to see how they protect, prop, and help one another. They are laborious and frugal, sober and saving unto the precise point where sordid avarice commences; they have also their *Siboleth* to recognise one another at all places, and not to mix with other workmen, even when they are Auvergnats of a different craft. When they have put by a certain sum they return to their mountains, to grow old there in snug little village comfort. To cover an umbrella or a parasol is a female's business. At times the *coureuse* has too much work on hand, at others she has none, and then loses much time in search of it; were it not for this her day's wages would be good, and the poor *ouvriere* would live well. France, after all, is a fine market for umbrella-makers! their *pays de Cocagne* is above all Brittany and Normandy. At Rouen rain falls three hundred and sixty-five days in the year, without reckoning the nights. Whole mountains of umbrellas are consumed at Rouen; the young *ouvriere*, who in the morning starts from the town to go to the printed cotton manufactories, buys on credit the pavilion which shelters her from this perpetual deluge; and it is curious to see on Saturday nights the roads covered with the venders come to exact from them on their way home the tribute of five sous destined slowly to cancel so sacred a debt.—*French Paper.*

Animated Bells.—A few days ago the following curious circumstance occurred in the peaceable little village of Prestbury:—The village chimes commenced playing at the usual time, and, to the no small astonishment of the villagers, continued to play for three hours before they stopped. No sooner had they ceased to vibrate than the clock began to strike, and struck 300 before the physical force of the whole village could stop it. This curious clock seems to have solved the perplexing problem which has puzzled all animated philosophers—perpetual motion.—*Cheltenham Chronicle.*

Chimney Sweeping Reformer.—A society has lately been formed at Bath, for providing church of England education for the young chimney-sweepers of that city, and for facilitating the gradual absorption into other branches of honest industry of such of them as will be thrown out of their employ by the Climbing Boys' Act of the last session of Parliament.

Dr. Lardner in New York.—Dr. Lardner and Mrs. Heavyside were in this city a few days ago. The Doctor intends to give lectures on public books.—*New York Herald*, Jan. 12.

Congress of Chess Players.—A project has been set on foot, by which it is intended to have a meeting of the Amateur Chess Players of Yorkshire, held annually at different towns in the country. The first of which is proposed to take place at Scarborough's Hotel, in Leeds, on the 18th inst., when games or matches will be played during the day, and at five o'clock an excellent dinner will be provided in Mr. Scarborough's best style; J. Milnes Gaskill, of Thorne's House, near Wakefield, having, in his usual urbane manner, kindly consented to take the chair. We trust the real lovers of Chess will eagerly embrace this opportunity, not merely to show their devotedness to this noble and scientific game, but will avail themselves of the advantage thus afforded to become more intimately acquainted with each other.—*Sheffield Iris.*—[Mr Gaskell is one of the best chess players in Yorkshire.—Ed. In. Ad.]

On Mixing Salt and Lime.—Salt and lime (one bushel of the former with two of the latter) must be mixed pretty intimately with each other three months before they are used. The heap is best placed in a shed, or thatched over, so as to preserve it from the rain. The wet makes it run into cakes, and renders it more difficult to spread evenly over the land. We have seen it used with decided success for turnips, wheat, barley, or oats, chiefly nn the light silicious lands of Essex and Hampshire. Mr. Bennett has been equally successful with it on the chalks of Wiltshire, and Sir Charles Burrell has used it with decidedly good results on the heavier soils of Sussex.—*Argus.*

Steam in the United States and Great Britain.—The *New York Herald* gives the following table as showing the number of steam-boat accidents in the United States and in Great Britain since the introduction of steam navigation, each country now having about 800 steam-vessels:—

Causes	United States. Vessels.	United States. Lives lost.	Great Britain. Vessels.	Great Britain. Lives lost.
Explosions and collapses	103	886	20	18
Snagged	73	118	0	0
Wrecked and collisions	35	473	48	181
Burnt	34	444	12	0
Unknown	27	0	0	226
Total	272	1,921	80	465
	80	465		
Balance against the United States	192	1,456		

The *Herald* adds—"This is as accurate as can be ascertained. But in addition there were 450 wounded in this country. And in Great Britain three steamers, the Erin, Forly, and Superb, were wrecked with all on board, which are not included in the above. It is supposed that 120 lives were lost in them. These, however, do not swell up the loss there to the loss here; and the table shows the recklessness with which human life has been sacrificed in this country. But from the English returns it appears that, notwithstanding 20 years' experience, the year 1838 was the most disastrous to steamers on the other side of the Atlantic."

On Friday morning last the grazing mills of the Kennall Gunpowder Company, near Penryn, exploded, by which a man named Martin was killed, and two others, named Grose and Chequiddon, were slightly injured. It has not been ascertained how the accident happened, as Martin was the only man on the premises at the time of the accident. The explosion was so great that the poor fellow's head was picked up full a quarter of a mile from the works, and other parts of the body were found at different distances. Fortunately neither the graining, drying, or sizing house exploded, but nearly all the glass in the windows was broken. A gentleman's house near the spot had sixty panes of glass and some articles of furniture broken by the shock.—*West of England Conservative.*

Port of Stockton.—The flourishing condition of this town may be seen from the receipts of customs, for the last five years:—1836, £54,497 17s 4d; 1837, £61,540 13s 1d; 1838, £69,285 13s 3d; 1839, £84,214 2s 6d; 1840, £97,225 18s 1d. —*Tyne Mercury.*

Port of Sunderland.—We have great pleasure in stating that this port is greatly increasing. The receipt of the Customs for the year ended the 5th instant is upwards of £119,000; being an increase of nearly £10,000 over the preceding year, and very nearly double the receipt for the year 1835, which was only £62,000. Since that time it has gradually increased to the present amount.—*Sunderland Herald.*

A Steam Challenge.—The captain of the Fame, Margate steamer, has offered to make a match for £200 a side that he will, in the month of May next, find a steam-boat to go from Ramsgate to London-bridge in less time than it can he done by a stage coach with four horses, to change as often as they think proper. The distance, we believe, is about eight miles further by water than by land.—*Kentish Mercury.*

Port Wines.—The total shipments of port wines from Oporto, in 1840, as appears by the Custom House return, just received, amounted to 33,190 pipes, of which 25,678 pipes were shipped to Great Britain, 2,793 to Brazil, 1,400 to the United States, 645 to Hamburgh, 11 to France, and 2,663 to other ports.

Velocipede Rate on a Railway.—We are not aware that the velocipede has ever been tried on a railway, and if the experiment has never been made, we are somewhat surprised at the fact, as the probability is that a very considerable speed might be obtained on a level rail. Some years ago, when the velocipede was first brought out, we witnessed a trial of its capabilities on a very ordinary road, and upon that trial we rest the conclusion, that, under more favourable circumstances, a much higher rate than ten miles in the hour is practicable. The place where the experiment to which we allude was made was a rope-walk out of Renshaw-street, which was by no means well adapted for the purpose. The exhibitor on that occasion succeeded in going ten miles within the hour, although the frequent turnings at each end of the rope-walk materially increased the labor. It occurred to us at the time, that on a much better road he would have progressed twelve or fifteen miles in the same time. When we take into account the great ease with which wheels move on a railway, it is not unreasonable to conclude that the same amount of muscular action of the legs and feet, which would enable the exhibitor to master ten miles in the hour on the common ground, would have enabled him to go fifteen or twenty miles in the same space of time.—*Liverpool Mercury.* [In a former number of the Inventors' Advocate the same subject was noticed, and the applicability of velocipedes to railways considered.]

Self-taught Type Founder.—We had yesterday the pleasure, says the *Paisley Advertiser* of Saturday, of seeing a specimen of printing from types cast in Paisley, and we feel proud tn state, that it presented a most creditable appearance. The very great accuracy required in this business, renders long practice and much instruction almost indispensable, and yet the types were cast by a young man who has had no instruction in the art. They are cast by the same ingenious young man who introduced stereotype founding into Paisley about nine years ago, and whom we should gladly name, were we not aware that his innate modesty shrinks from publicity. Paisley, as the Americans would say, is going a-head.

Spots on the Sun.—For some time past the spots on the sun's disc have been numerous, and occasionally very large. At present there are two or three of considerable size, besides some clusters of small ones. About a week ago one disappeared at the west limb, which had been observed during two revolutions of the sun on its axis; but its size had considerably diminished between its first and second appearance. When first observed it was of an oval form, and its longest diameter about 27,000 miles; but, on its second appearance, was reduced to 14,000, and had become nearly circular. Two of those at present visible are about the size of the earth. They may be distinctly seen with an ordinary telescope and dark glass.

Coal in India.—Lieut. Hutchinson, to whom the operations for working the Mirgui Coal mines have been intrusted, has made great progress in sinking the shafts and constructing tramroads.

Extension of Bank of England Notes.—The Hampshire Banking Company, a joint-stock bank, having its head office at Southampton, is, we understand, on the point of coming to an arrangement, if, indeed, it has not done so already, with the Bank of England, for the withdrawal of its own notes, and the substitution of those of the latter establishment. The present case of conjunction, or coalition, between the Bank of England and a joint-stock company, is worthy of some attention, as it appears to be the first in which a bank in an exclusively agricultural district has been concerned.—*Morning Post.*

New Penny Pieces.—Specimens of new coins have just been issued from the Mint, consisting of penny pieces. They are materially different from those now in use, as there is no lettering upon them with the exception of the date. On one side is a medallion likeness of her present Majesty, and occupies nearly the whole of one of the sides of the pieces. On the obverse is a figure of Britannia, similar to those on the fourpenny pieces, under which is placed the date. The outside of the rim is perfectly smooth, but it is raised in such a manner as to afford ample protection to the figures on the body when in use.

Bursting of a Boiler.—On Saturday last there was a dreadful explosion and shock, occasioned by the bursting of a boiler at the iron-works of Mr. D. Jones, at Bilston Brooks works, when one of the most awful sights we ever beheld was witnessed. We are sorry to have to record that six or seven of the men were very much scalded. One of the men, named Daniel Evans, is since dead from the injury received; and two or three more lie in a very dangerous state, with little hopes of their recovery. We are sorry to say that the works are very much injured by the accident. It is said it will take £400 or £500 to put them in repair.—*Staffordshire Gazette.*

Royal Jennerian and London Vaccine Institution.—The annual meeting of the governors of this society was held on Thursday afternoon, at the George and Vulture Tavern, Cornhill. The report of the board of managers congratulated the meeting on the increased number that during the last year has been vaccinated at the institution. In 1839 the number of children was 6,538, whilst last year it was 7,913, making an increase of 1,375. From a statement of the progress of the society since its formation in 1806, it appeared that there were then vaccinated but 684, whilst the supplies of virus were but 1,357, whilst last year there were upwards of 60,000. From its first formation there had been 160,015 persons vaccinated at the institution, whilst the charges of matter distributed were 1,297,775. Another testimony to the excellence of the vaccine virus supplied by the institution was the fact that the King of the Belgians, whilst in this country last year, ordered some to be sent to Claremont for the purpose of vaccinating the Royal infant. The various European, African, and South American States continually received supplies from the institution, whilst Asia had last year been added to the other quarters of the world previously supplied. Whilst the war was going on against Syria, William Allen, the eminent philanthropist, sent for vaccine to be employed in Beyrout and Damascus, thus following the example of Dr. Walker, the first director of the institution, who accompanied the British fleet to Alexandria, there to diffuse the blessings of vaccination. The report next alluded at length to the new Vaccination Act, which it considered would, by rendering the practice compulsory, lessen the conviction of its utility on the minds of the public. The income of the last year was stated at £571. 16s., but it had been found requisite to reduce many of the expenses.

Rapidity of Expressing.—The India news, which arrived at Marseilles on the 4th ult. 1 o'clock p.m., was published at London in *The Times* of the 8th ult., 4 o'clock a.m. India Mail, from Bombay the 1st November. *The Times* express reached London on the 8th ult. Mail *viâ* Marseilles reached London on the 9th ult., Mail by the Oriental *viâ* Falmouth reached London on the 14th ult.—*Malta Times.*

Coach Accident.—The London and Aberystwith mail, on its way to Kington, was overturned on Monday morning near Strethough, going at the foot of Plinlimmon. In consequence of the snow-storm the coachman had provided an extra pair of horses, and the postilion missed his way in crossing the road, where on one side is a ravine of considerable depth, into which the coach and two inside passengers were precipitated, the whole turning over twice or thrice, and yet both gentlemen miraculously escaped with only a few slight scratches and bruises. The coachman and guard threw themselves off and were not hurt, and the postilion received no injury, although he was in a most perilous situation.—*Hereford Times.*

Coal-pit Accident.—The Hean Castle Colliery, near Saundersfoot, Pembrokeshire, was on Saturday the scene of an accident, by which two persons were deprived of life, and another placed in the most perilous circumstances. One of the colliers, accompanied by two boys, was preparing to ascend the pit, and had just got into the "tram" which was to take them to the surface, when another tram, full of coals, which had reached the mouth of the pit in safety, was suddenly precipitated down the shaft, and before the men could escape they were crushed beneath it. One of the lads was instantly killed, his brains being dashed out. The man expired in the course of the day. The skull of the other lad was dreadfully fractured, so that the brain protruded, and for some days his life was despaired of. An inquest was held on the body on Wednesday, when a verdict of "Accidental Death" was returned.—*Carmarthen Journal.*

ADVERTISEMENTS.

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THE

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THE ACTION OF HYDRAULIC BELTS.

The plan of raising water from great depths by the apparent adherence of the fluid to the surface of a rapidly-moving endless rope, or belt, seems to challenge some explanation of its cause, and of the principles on which the advantage gained by this mode of operating depends. We are not aware that any satisfactory explanation has yet been offered of the extraordinary effects produced by these machines; we will therefore endeavor to show the nature of their action, and to point out the cause of their superiority to a chain of buckets.

Let us, in the first place, describe the apparatus, so that all our readers may be aware of the peculiarity of the effects which it produces. Hydraulic belts may be variously constructed, but as that of Mr. Hall was the first brought into notice we shall take that as the groundwork of our description. It consists of a strip of thick woollen cloth, four, or more, inches in width, and long enough to reach, when doubled, from the place to which the water is to be raised to the water in the well. The two ends of this strip of cloth are fastened together, so as to form an endless belt. This belt passes over a drum, or wheel, fixed below the surface of the water; and also over a drum at the greatest elevation. A rapid rotary motion is given by multiplying wheels to the upper drum, and this is communicated to the endless belt, which is kept stretched tight for that purpose When the machine is thus put in action, that part of the belt which is in the well carries with it, in rising, a quantity of water on its surface, and when it comes to the top, this apparently adhering water is thrown off by its tangential force in passing round the drum. To produce these effects, however, it is necessary that the belt should move with considerable velocity; for with a slow motion nearly all the water would fall back into the well.

The phenomenon of the water rising with the belt will be easily understood, as the same thing occurs, in a minor degree, whenever we take a piece of cloth out of water. The adherence of the particles of liquid to each other is sufficient to communicate to those adjoining the upward motion which is given to the water absorbed by the texture of the cloth. The extraordinary part of the working of the apparatus consists in the great quantity of water which is carried upwards against the constantly operating force of gravitation. This effect depends, however, entirely on the rapidity of the motion. When the belt moves with velocity through the water, it communicates motion to a larger body of surrounding fluid, which thus rises with the belt and apparently adheres to it, though in fact the water which is seen on the outside may be merely obeying the impulse it has received, and has no real adherence to the woollen. The only adhering property obtains between one particle of water and another, which is sufficient to communicate the upward motion in the first instance, and to continue the impulse, partially, to its highest elevation. It may be readily conceived that if the force with which the water is impelled upwards is sufficient to counterbalance the force of gravitation, it will require no adherence to the belt to explain the cause of its rising to the upper drum. The rising stream of water would, in such case, resemble a fountain playing by the side of the moving belt. There is reason to believe, however, that the impulse first given to the water is not sufficient to carry it to the top, and that it is constantly receiving an additional impulse from its adherence to the particles of fluid absorbed by, and moving with, the belt. The force of gravitation on the external layer of water must consequently be always tending to diminish the amount carried up, and as its action is constantly exerted on the whole column of fluid, a quantity of water lifted out of the well must, even in the best constructed hydraulic belts, fall back again.

Having thus shown the nature of the action of hydraulic belts, we will explain the cause of their advantages compared with other contrivances for lifting water; more particularly in reference to the system of buckets, to which it bears a close analogy.

On a first consideration of the subject, it appears that the hydraulic belt must be inferior to buckets on account of the waste of power arising from the constant flow of back-water, which is raised to a certain height from the well to fall back again. Be this quantity great or small, still to that extent it tells against the profitable action of hydraulic belts compared with a chain of buckets. We confess this was the view we first took of the action of this apparatus, and we conceived there must be some error in the calculation of the quantity of water lifted compared with the power employed. A further consideration of the subject, however, induced us to alter this impression.

The advantages of the hydraulic belt depend, we conceive, on the principle, that the amount of power exerted by all constantly-acting forces is *in proportion to the time of their action.* We explained this principle in several preceding articles, and showed its applicability to explain numerous phenomena in mechanical science.* In the present instance the constantly-acting force of gravitation is to be counteracted in lifting water from a deep well. The amount of the resistance of gravitation depends on the time of its action; consequently, the more rapidly a body moves through a given space against that force, the less total resistance will be experienced. If, for instance, water be drawn up in a bucket, by slowly winding a rope round a windlass, the force of gravitation will be acting against the power, say, for one hundred seconds. If it be drawn up by machinery in one second, the *gravitating force* to be overcome will be only one hundredth part the amount in the former case.

This principle is readily applicable to the hydraulic belt. The power required must be equal to keep a column of water of the same volume as that which is carried up by the belt constantly raised to the upper drum. The weight lifted, or, in other words, the resistance of gravitation to be overcome, would be the same, whether this column of water were stationary, or were moving with great velocity. If, then, a very rapid motion is communicated to this column of water, an immense quantity may be raised without any increase to the resistance of gravitation. The additional power required, is merely that necessary to communicate the increased velocity to the fluid, without any reference to its lifting. We thus perceive that it is the facility which the hydraulic belt affords of raising a small column of water with great velocity, in which its advantages consist; and these advantages are more than sufficient to counteract the loss from the back-water, which must be more or less acting against the power.

Practice can alone determine the amount of velocity best calculated, under any given circumstances, to produce the best effect. Generally speaking, the greater the velocity the greater should be the advantage obtained; though with higher

* Inventors' Advocate, Nos, 56, 58, 59, 60.

velocities it would be necessary to immerse the belt lower in the water, and additional "holds" on the fluid should be contrived. Several modifications have been made in the hydraulic belt, to give it a greater absorbent property or "hold" on the water. One of these arrangements, recently introduced, is to fix sponge on the surface, which we believe to be a great improvement, and is found to add materially to the efficiency of the belt. The great object to be gained is, to diminish, as much as possible, the quantity of water that falls back into the well, and to adapt the apparatus so that the quantity of water lifted may increase with the most rapid motion that can be practically communicated.

PATENTS.—BRITISH AND FOREIGN.

MONTHLY LIST OF NEW PATENTS.

CHARLES GOLIGHTLY, of Gravel-lane, Southwark, gent., for *a new apparatus for obtaining motive-power.*—6 months, Jan. 4.

GEORGE CHILD, of Lower Thames-street, merchant, for *improvements in the manufacture of bricks and tiles, part of which improvements are applicable to compressing peat and other materials.*—6 months, being a communication, Jan. 4.

JOHN SWINDELLS, of Manchester, manufacturing chemist, for *certain improvements in the manufacture of artificial stone, cement, stucco, and other similar compositions.*—6 months, Jan. 6.

WILLIAM NEWTON, of Chancery-lane, civil engineer, for *certain improvements in looms for weaving.*—6 months, being a communication, Jan. 6.

JOHN ROCK DORY, of Great Queen-street, Lincoln's-Inn Fields, saddlers' ironmonger, for *certain improvements in the construction of collars for horses and other draft animals.*—6 months, Jan. 6.

HENRY GUNTER, of Cullum-street, Fenchurch-street, merchant, for *improvements in preserving animal and vegetable substances.*—6 months, Jan. 6.

HENRY BESSEMER, of Perceval-street, Clerkenwell, for *a new mode of checking the speed of, or stopping railroad carriages under certain circumstances.*—6 months, Jan. 6.

WILLIAM THOMPSON, of Upper North-place, Gray's-inn-road, brush-maker, for *improvements in the construction and mounting of various kinds of brushes and brooms.*—6 months, Jan. 8.

WILLIAM LACEY, of Birmingham, agent, for *certain combinations of vitrified and metallic substances applicable to the manufacture of ornaments, and the decorations and improvements of articles of domestic utility, and of household furniture; also applicable to church windows and shop lights.*—6 months, Jan. 11.

MATTHEW UZIELLI, of King William-street, merchant, for *improvements in impregnating and preserving wood and timber for various useful purposes.*—6 months, being a communication, Jan. 11.

WILLIAM NEWTON, of Chancery-lane, civil engineer, for *improvements in machinery for cleaning wheat and other grain or seeds from smut and other injurious matters.*—6 months, being a communication, Jan. 11.

JOHN BARWISE, of Saint Martin's-lane, chronometer maker, and ALEXANDER BAIN, of Wigmore-street, Cavendish-square, machinist, for *improvements in the application of moving power to clocks and time-pieces.*—6 months, Jan. 11.

THOMAS HARRIS, of Chiffnall, Salop, veterinary surgeon, for *an improved horse shoe.*—6 months, Jan. 11.

JOSEPH HALL, of Cambridge, grocer and draper, for *a seed and dust disperser, which is particularly applicable to the freeing of corn and other plants from insects.*—6 months, Jan. 14.

WALTER HANCOCK, of Stratford Le Bow, engineer, for *certain improved means of preventing accidents on railways.*—6 months, Jan. 14.

PIERRE ARMAND LE COMTE DE FONTAINEMOREAU, of Skinner-place, Size-lane, for *an improved machinery for carding and spinning wools and hairs, which he titles "Filo-finished."*—6 months, being a communication, Jan. 14.

MELCHER GARNER TODD, of the Island of Saint Lucia, for *a certain improved form of apparatus for the distilling and rectification of spirits.*—6 months, Jan. 14.

JOHN LOACH, of Birmingham, brass-founder, for *certain improvements in castors applicable to cabinet furniture and other purposes.*—6 months, Jan. 14.

WILLIAM KING WESTLEY, of Leeds, flax machinest, for *certain improvements in carding, combing, straightening, cleaning, and preparing for spinning hemp, flax, and other fibrous substances.*—6 months, Jan. 14.

WILLIAM KENWORTHY, of Blackburn, spinner, and JAMES BULLOUGH, of the same place, overlooker, for *certain improvements in machinery or apparatus for weaving.*—6 months, Jan. 14.

CHARLES CAMERON, Esq., of Mount Vernon, Edinburgh, for *certain improvements in engines to be actuated by steam and other elastic fluids.*—6 months, Jan. 14.

SAMUEL HALL, of Bowford, Nottingham, civil engineer, for *improvements in the combustion of fuel and smoke.*—6 months, Jan. 14.

ALEXANDER JONES, of King-street, London, engineer, for *improvements in the manufacture of copper tubes and vessels.*—6 months, Jan. 14.

EDWARD FOARD, of Queen's Head-lane, Islington, machinist, for *an improved method or improved methods of supplying fuel to the fire-places or grates of steam-engine boilers, brewers' coppers, and other furnaces, as well also to the fire-places employed in domestic purposes, and generally to the supplying of fuel to furnaces or fire-places in such a manner as to consume the smoke generally produced in such furnaces or fire-places.*—6 months, Jan. 14.

JOHN ANNES, of Plymouth, painter, for *a new and improved method of making paint from materials not before used for that purpose.*—4 months, Jan. 14.

JAMES SMITH, of Deanstone Works, Kilmadock, Perth, cotton spinner, for *certain improvements in the preparing, spinning, and weaving of cotton, silk, wool, and other fibrous substances, and in measuring and folding woven fabrics, and in the machines and instruments for those purposes.*—6 months, Jan. 19.

THOMAS ROBINSON, Esq., of Wilmington-square, for *improvements in drying woollen and other fabrics.*—6 months, Jan. 19.

THOMAS VAUX, of Frederick-street, Gray's-Inn-lane, worsted manufacturer, for *improvements in horse shoes.*—6 months, Jan. 19.

CALEB BODELLS, of Leicester, manufacturer, CRISTOPHER NICKELLS, of York-road, Lambeth, gent., and ARCHIBALD TURNER, foreman to the said CALEB BODELLS, for *improvements in the manufacture of broids and plats.*—6 months, being partly a communication, Jan. 19.

JOHN BARBER, of Manchester, engraver, for *certain improvements in machinery, for the purpose of tracing or etching designs or patterns on cylindrical surfaces.*—6 months, Jan. 19.

FREDERICK STEINER, of Hyndburn Cottage, Lancaster, Turkey red dyer, for *improvements in looms for weaving and cutting asunder double-piled cloths, and a machine for winding weft, to be used therein.*—6 months, being a communication, Jan. 19.

JOHN COX, of Georgie Mills, Edinburgh, tanner, for *improvements in apparatus for assisting or enabling persons to swim or float, or progress in water.*—6 months, Jan. 19.

CHARLES BERWICK CURTIS, of Acton, Esq., for *a method or methods to be used on railways for the purpose of obviating collisions between successive trains.*—6 months, Jan. 19.

ANGIER MARCH PERKINS, of Great Coram-street, engineer, for *improvements in apparatus for heating by the circulation of hot water, and for the construction of pipes and tubes for such and other purposes*—6 months, Jan 21.

JOHN MELVILLE, of Upper Harley-street, Esq., for *improvements in propelling vessels.*—6 months, Jan. 21.

WILLIAM HILL DARKER, sen., and WILLIAM HILL DARKER, jun., both of Lambeth, engineers, and WILLIAM WOOD, of Wilton, carpet-manufacturer, for *certain improvements in looms for weaving.*—6 months, Jan. 21.

JOHN BRADFORD FURNIVAL, of Street Ashton, Warwick, farmer, for *improvements in the construction and application of air-vessels.*—6 months, being a communication, Jan. 21.

WILLIAM COOPER, of Layham, Suffolk, iron-founder, for *an improved method of constructing thrushing-machines, and other agricultural instruments.*—2 months, Jan. 21.

ISHAM BAGGS, of Cheltenham, gent., for *improvements in printing.*—6 months, Jan. 23.

PETER FAIRBAIRN, of Leeds, engineer, and WILLIAM SUTTILL, of the town of Newcastle-upon-Tyne, flax-spinner, for *certain improvements in drawing flax, hemp, wool, silk, and other fibrous substances,*—6 months, Jan. 26.

EDWARD HENSHALL, of Huddersfield, carpet-manufacturer and merchant, for *certain improvements in making, manufacturing, or producing carpets and hearth rugs.*—4 months, Jan. 26.

NATHANIEL LLOYD, of Manchester, and HENRY ROWBOTHAM, of the same place, calico-printer, for *certain improvements in thickening and preparing colors for printing calicoes and other substances.*—6 months, Jan. 26.

NATHAN WADDINGTON, of Hulme, Lancaster, engineer, for *certain improvements in the construction of steam boilers, and furnaces for heating the same.*—6 months, Jan. 26.

CORNELIUS ALFRED JAQUIN, of Huggin-lane, for *improvements in the manufacture of covered buttons, and in preparing of metal surfaces for such manufacture and other purposes.*—6 months, Jan. 26.

JOHN BRADFORD FURNIVAL, of Street Ashton, farmer, for *improvements in evaporating fluids, applicable to the manufacture of salt, and to other purposes where evaporation of fluids is required.*—6 months, being a communication, Jan. 26.

RICHARD JENKYN, of Hoyle, Cornwall, machinist, for *certain improvements in valves for hydraulic machines.*—6 months, Jan. 26.

WILLIAM GALL, of Beresford-terrace, Walworth, gent., for *certain improvements in the construction of locomotive-engines, and of the carriages used on railways, applicable in part to carriages used on common roads.*—6 months, being a communication, Jan. 28.

WILLIAM CURRIE HARRISON, of Newland-street, Eaton-square, Pimlico, engineer, for *an improved turning table for railway purposes.*—6 months, Jan. 28.

JOSEPH PRYOR, of Wendron, Cornwall, builder, *an improved threshing-machine.*—6 months, Jan. 28.

JAMES MAC LELLAN, of Glasgow, manufacturer, for *an improved combination of materials for umbrella and parasol cloth.*—6 months, Jan. 30.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLLMENT OFFICE.

(*Continued from page 51.*)

ALEXANDER FRANCIS CAMPBELL, of Great Plumstead, Norfolk, and CHARLES WHITE, of Norwich, for *improvements in ploughs and other agricultural implements,* Nov. 28.—Claim first.—The dispensing with the pulley and the lifting gear con-

nected with it, as hitherto used in subsoil and subturf ploughs, for the purpose of raising the fore part of the beam, and also applying to the beam a hind wheel, without its axis being carried by the drag frame.

Claim second.—Mode of applying an axle in combination with a hind wheel and fore carriage, or wheel, to hoes.

Claim third.—Mode of constructing hoes by the employment of tension blades.

Claim fourth.—Mode of applying the draught to a point behind the fore wheel carriage of hoes and ploughs; such draught being independent of the fore carriage laterally, and for the purpose of steer age, when the beam has no joint to move laterally.

Claim fifth.—Mode of constructing ploughs, by the application of tension blades as shares.

Claim sixth.—Mode of constructing ploughs by applying lever handles to the beams; to steer such ploughs, when the beams are capable of lateral movement, with reference to the working parts, the fore carriage being the fulcrum of such leverage.

Claim seventh.—Mode of constructing ploughs by applying axes for adjusting the position of the shares in combination with the fore and hind wheels.

Claim eighth.—Mode of constructing ploughs by the application of a draught iron, capable of lateral movement.

Claim ninth.—Mode of applying the axis of a double cone wheel.

Claim tenth.—Mode of constructing a turn, or reversing plough, by means of two ploughs placed one over the other, and carried on a hind wheel with a suitable fore carriage.

Claim eleventh.—Mode of constructing drain ploughs with the application of joints,' for the purpose of adjusting the position of the share.

Claim twelfth.—The application of racks with suitable adjuncts.

Claim thirteenth.—Mode of constructing and applying a pendant frame.

Wm. Hickling Burnett, of Wharton-street, Bagnigge Wells-road, for *improvements in machinery for cutting and working wood*, Dec. 24.—These improvements relate,—First, to an improved system of guides for boards or scantlings of wood while passing through the wood-cutting machines.

The frame of the guides is of iron, and will vary in shape in different machines. It forms the bed on which the guides traverse. The guides are formed of pairs of poppet heads; one head in each pair being fixed and the other moveable, in order to hold and guide wood of different sizes, holding the blocks by their sides. There is also an arrangement of moveable pieces which slide over the inner vertical faces of the guides and press upon the upper surface of the wood, which is thus held perfectly steady.

Secondly, an improved mode of elevating and depressing the upper pairs of rollers, when the wood is carried forward by their means.

The blocks in which the axes of the upper rollers turn are moveable, and slide in grooves in the upright side frames of the machine. They are capable of being regulated by a series of mitre and spur wheels, acting in connection with spiral springs by which the wood may be held firmly, and yet by means of the springs an elasticity is obtained to allow of any irregularity in the surface of the wood passing between the rollers.

Thirdly, an improved mode of admitting oil to the working parts, viz., the circular saws, shafts, spindles, &c.

This consists in the construction of an oil cup; the tube through which the oil flows is intercepted by a cock, in such a manner as to allow of any number of drops per minute to flow through, and fall from the nipple into the channel leading to the bearings to be oiled.

Fourthly, an improved mode of sawing and dividing the wood, so as to plane it at the same time, which arrangement is also applicable to veneer saws.

This is accomplished by having circular saws, near the periphery of which are slits approaching the edge as near as possible, consistently with strength. In these slits, side cutters are fixed with their edges ground and set to the same angle as a plane iron, and projecting slightly beyond the set of the teeth of the saw, by which means a shaving may be continually taken from the wood at the time the saw is at work. Other forms are shown by which the sides of the slobs formed in the plate of the saw may be turned up, instead of having a detached side cutter.

Fifthly, The application of the last-named construction in conjunction with two or more sets of circular cutters, so as to form two or more strips of plain or ornamental moulding.

For this purpose two or more circular saws are to be mounted on the same spindle, between which, instead of washers, blocks are fixed, the upper parts of which hold the cutters. These are circular, and may be either plain or moulded, and they project sufficiently to perform the necessary operation as fast as the circular saws are ripping the scantlings or boards into strips.

Sixthly, an improved mode of forming moulding and other cutters.

These may be of any desired shape, and are fastened to blocks, fixed on the same spindle as the saws, by means of grooves and feathers. They are made out of thin plates of steel, and are screwed between two other plates, which are worked down on either side so as to leave the steel edge standing outwards about one twentieth of an inch.

Seventhly, a machine for preparing deals and baulks of timber for sawing.

The block of wood is placed on a metal bed moved by a rack and pinion, and slides on "V" pieces fixed firmly on the floor. Upon this bed is fixed the apparatus for holding the timber firmly in its place for the operation of the cutters; poppets are screwed to the sliding bed. Their inner faces are made perfectly true, and vertical to these faces a cast iron beam is attached, in such a manner that it may be moved up and down by means of screws and nuts, and serves to clip the upper part of the block of wood. The holding parts are so adjustable that any size may be held at different sides quite firmly, and forwarded by the sliding bed and other apparatus to the cutters, for preparing a flat or square side thereto.

Eighthly, a machine for the same purpose, which may also be used for cutting mouldings on cornices and skirtings.

The wood is secured to a table and moved forward by a chain, rack, and pinion, or any other convenient means. Above it are placed the circular cutters, which are made to revolve, and adze the required shape or pattern on the edge of the block while it is advancing.

Ninthly, another machine for the same purpose, only in which the machinery with the cutters approach the wood instead of the wood approaching the cutters.

This consists of a fixed bed on which another bed travels. This bed supports the cutters, with their driving drums, &c. &c. A table is constructed so as to rise and fall, on which the wood is placed and held, while the machinery and tools on the sliding bed are made to approach and perform the required work thereon.

Moses Poole, of Lincoln's Inn, for *improvements in fire arms, and in apparatus to be used therewith*, (being a communication), Jan. 18.—A projection is formed at the outside of the breech, through which a hole is made to receive the axis of the peculiar-formed apparatus. This consists of a lever on an axis capable of being thrown back, for the purpose of a cap being supplied to the nipple, and then shut down at the back of the breech, thereby preventing the cap from falling off. The hammer on being brought down does not strike the cap (as in the ordinary way), but the lever, when the piece is discharged. These improvements are shown in the specification as applied to a pistol, but the inventor observes that they are applicable to other kinds of fire-arms, as the difference consists principally in the varied form of the stock.

James Jamieson Cordes and Edward Locke, of Newport, for *a new rotary engine*, Jan. 18.—These improvements consist in rotary engines as hereafter described; the distinguishing peculiarity of which is, that a revolving wheel is enclosed in an exhausted box, or case, and impelled or turned rapidly round by a constant current of steam entering with force and velocity into the exhausted space wherein the wheel is set, and impinging against vanes placed at the circumference of the wheel in the direction of a tangent. The wheel is mounted on an axle, and has a rim formed by two cylindrical plates, projecting outwards, across which rim the vanes are set. The casing, or box, is made of cast iron and mounted on the same axle as the wheel. It is made in two parts and fastened together by bolts and nuts, and is provided at its centre with suitable stuffing-boxes to hold the packing. The steam is admitted at one side by a steam-pipe having a throttle valve, and after acting against the vanes escapes by an opening at the lower part of the wheel leading to the condenser, which is contained in a cistern of cold water beneath; part of which cistern is partitioned off so as to form a hot-water chamber, by which the boiler is supplied. In the cold-water cistern are three seatings of pump barrels, connected together and working successively like a continual air pump, by which means the condenser is exhausted and kept so; these pumps are worked by solid pistons, and pump the contents of the condenser into the hot-water cistern. An arrangement is shown for keeping the bearings of the main axle cool, and consists of having a portion of the middle of the outer surfaces turned away, so as to leave an opening all round. To each side two small pipes are fitted, one carries water from the cold-water cistern, the other returns it to the hot-water cistern, by which means a constant current of cold water is supplied to the bearings of the main axle. One end of the main axle carries a suitable wheel for communicating motion to the machinery, and to the other end a pinion is fixed so as to turn a spur wheel. This is keyed on a triple crank shaft, which cranks are connected to and work the solid pistons of the pump barrels. The outer end of the axle is connected to the piston of the force pump, for supplying the hot water to the boiler. On the same shaft is also fixed a mitre wheel, which gearing with another, works the governor of the engine; to which a crank lever is fixed, in order to command the throttle valve in the steam pipe. The iron casing of the wheel is supported on standards raised on proper brickwork, in which the cistern is also fixed. The standards are secured in their places by means of long bolts and nuts passing the brickwork and through the foundation plate.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page 51.*)

James Roberts, of Brewer-street, Somers'-town, for *improved machinery, or apparatus, to be applied to windows of houses and other buildings, for the purpose of preventing accidents to persons employed in cleaning the same, and also for facilitating the escape of persons from houses when on fire.* Jan. 18.—These improvements consist of three distinct constructions of machinery.

First.—An improved apparatus for cleaning and repairing windows. This is a rectangular box, open, under which a bracket frame is applied, having two side bars, and connected by a rod to the outer parts. The inner extremities of these two bars are turned up into hooks, which are to be attached to eyes fixed to the inner sill of the window. A rail of wood is also fixed to the bottom of the frame, so as to form a bearing, which rests on the outer sill of the window. This frame is first placed in its proper position, and the box put upon it, when two studs will pass through the bottom of the box, and be held by spring bolts, thereby fixing the box securely, which is then ready for use.

The second machine is a portable combination of levers, on the principle of the lazy tongs. A rod, or bar, forms a handle, by which the combination may be either expanded or collapsed, a fellow bar constituting the standard or fulcrum. The end of this is placed upon the ground, and a resistence is

formed by the foot of the fireman, who first places his left hand firmly on the top of this bar, and then, with his right hand, depresses the first lever, which causes the reverse end of the apparatus to be raised, and a swivel hook to be projected into the sill of an open window. A pulley, attached to the upper lever, carries a rope, attached to a basket, or other receptacle, which may thus be raised to assist the escape of any person from the window. A sector racket rack attached to the lower lever passes through a socket, formed in the side of the standard, a click taking into the teeth of the racket, in order to prevent the levers from collapsing.

The third construction is made so simple as to be capable of being kept in a bed or dressing-room table. A rectangular iron frame forms the entrance to another canvas tube. The lower part of the frame is elongated, so as to be equal to the width of the window, which prevents the apparatus from shifting laterally. The upper rail is connected to a long rod, extending across the window-frame. The apparatus is connected to a table by chains, or bands, attached to an iron rod, fixed to the backs of the table. When the frame is properly fixed, the sacking is pushed downwards, and reaches to the ground, when any person, by the help of a knotted rope, may easily descend, or be gradually lowered. The canvas rope, &c., is to be previously saturated with a solution of alum water, or other anti-combustible mixture.

ENTERED AT THE PETTY BAG OFFICE.

(Continued from page 52.)

PETER FAIRBURN, of Leeds, *certain improvements in machinery or apparatus for heckling, combing, and preparing hemp, flax, and other textile and fibrous materials*. Jan. 13.—Claim first.—Mode of giving elasticity to the heckles.

The heckle bars are formed of hollow cylinders of brass, with a row of small holes in which the points of the heckles are inserted. The inside is filled with melted cement, and each end is furnished with a stud, or pivot, by which the heckle bars are held when mounted on the drum. A small cord is attached to the heckle bar, near each end, and passes over it on one side, and then passes through small holes in the periphery of the drum, and is connected to helical springs, fixed to the blocks within. A similar arrangement is also fitted to the guides or strippers.

Claim second.—Mode of mounting the heckles upon a rotary drum.

The drum is composed of two wooden circular ends, connected by an iron axle. The periphery is formed of thin plates of zinc, fixed on the outer edge of each wooden end of the drum. A series of segments form a rim or flange of iron, through which a circle of small holes is perforated, and through which holes the pivots of the heckle bars are inserted.

Claim third.—The method of stripping the tow from the heckles, by means of sliding strippers, worked by eccentric wheels.

The strippers are made to slide in radial slots, in the flanges, by means of eccentric wheels, the peripheries of which act against all the ends of the strippers, and force them out at one point of the rotation of the drum, to the extremity of the slots, the hedical springs drawing them in again at the opposite point of their rotation, and keeping their ends constantly bearing against the outer edges of the peripheries of the eccentrics.

Claim fourth.—The cylindrical casing of the drum.

The casing consists of two circular wooden ends, mounted loosely on the main axle. The cylindrical part of the casing is formed of plates of zinc, left open in parts to admit the strick of flax when submitted to the operation of the heckles; and also to discharge the tow from the points of the heckles as the heckling goes on.

Claim fifth.—The manner of applying a powerful current of air to the surface of the heckle drum, for the purpose of carrying off the tow.

On the strippers being slidden to the outer extremity of the radial slots, in the flanges, on the lowest part of the rotary movement of the drum, they push off the tow that has accumulated on the heckles towards their points, when a powerful current of air, created by a rotary fan placed below, carries it off entirely, and deposits it in a box beneath.

EDWIN TRAVIS, of Shaw-mills, near Oldham, *improvements in machinery or apparatus for preparing cotton and other fibrous materials for spinning*. Jan. 15.—An endless lattice is mounted on rollers in suitable framing. Just above this there is a second endless lattice, each revolving on a pair of smooth rollers. The fibrous material is placed on the upper side of the lower lattice; and the distance between the two lattices measures or regulates the quantity of cotton or other fibrous material that can be permitted to pass through the machine. Beyond these two lattices is a pair of plain rollers; immediately behind which the feed rollers are placed, and in front of a wooden cylinder, having blades around its periphery. Behind this cylinder, and situated lower than the other lattices, is a third endless lattice, in a line with the upper surface of which another plain roller revolves. Over the top, and at a regulated distance from it, are three plain rollers, in a line with which a flat surface of wood extends across the machine, and fills the space between the last plain roller and the upper delivery roller, which is situated immediately behind this last arrangement of an endless lattice. Plain rollers and wooden surface, form a kind of box, for the prepared material, which will always remain full by the motion of the delivery rollers being regulated slower than the other parts.

The cotton, or other fibrous material, is placed on the first lower endless lattice, and passes through the pair of plain rollers to the feed rollers; from which it is broken off by the blades on the periphery of the wooden cylinder, and delivered on to the third endless lattice, the quantity received being regulated by the wood cylinder, which will carry over any surplus, causing it to pass under the perforated dust cylinder, and delivering it again on the outer end of the first endless lattice. In front of the upper plain rollers, over the last endless lattice, there is a fluted roller, to preserve the required uniformity to the material, in the enclosed space, or box, in front of the delivery rollers, on passing between which it is received by the "lap," and is assisted in its progress through the box, by the upper and under rollers, endless lattice, &c.

JOHN LAMBERT, of Coventry-street, Westminster, *improvements in the manufacture of soap*, (a communication,) Jan. 15.—These improvements consist in manufacturing a certain cheap paste, to be mixed with the soap.

Bones are first to be cleaned with diluted sulphuric acid, and then broken into small pieces and placed as closely as possible in any suitable vessel. They are then covered with caustic alkaline ley, or lees of crystals of soda, specific gravity, 1.120 to 1.140—the gravity of the water being taken at 1.000. This is suffered to remain for about a fortnight or three weeks, when it will be reduced to the consistency of kitchen stuff, and is then ready for the next process. This consists in passing it between three pairs of rollers, having suitable hoppers, and placed one above the other, the lower ones being closed slightly together, and one in each pair turning faster than the other, which gives friction, as well as pressure, to any substance passed between them. The paste is to be passed between these rollers, and then heated by steam, when it is ready to be mixed with the soap, which should be done when the soap is in a state for framing, and is well stirred, while hot, for the purpose of properly incorporating one with another; when the whole is to be framed as soap is usually done. The paste will be improved by adding 10 lbs. of tallow and 10 lbs. of caustic alkaline ley, or lees, to every 100 lbs. of paste; and should the paste be too thin, the heating must be continued until the necessary evaporation takes place: if too thick, it may be thinned by the caustic alkaline lees. The quantity of paste used will depend on the required quality of the soap: a poor soap may be made of 2-3d paste and 1-3d soap.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" as follows:—

ON THE 27TH OF MARCH.

William Bedford, of Leicestershire, due March 17.

Henry Fourdrinier, of Stafford, due March 17.

Moses Poole, of Lincoln's-Inn, due March 17.

Walter Richardson, of Regent-street, due March 17.

Samuel Draper, of Nottingham, due March 17.

William Mill, of Blackfriars-road, due March 21.

Charles Handford, of High Holborn, due March 21.

ON THE 3RD OF APRIL.

Thomas Paine, of Upper Seymour-street, due March 22.

John Maugham, of Connaught-terrace, due March 24.

George Goodman, of Hanley, due March 24.

John Gibson, of Glasgow, due March 24.

William Hirst, of Leeds, due March 24.

Pierre Erard, of Great Marlborough-street, due March 24.

Henry Pinkus, of Panton-square, due March 24.

John Johnston, of Glasgow, due March 24.

Thomas Robinson Williams, of Cheapside, due March 24.

Alexander Dean, of Birmingham, due March 24.

BRITISH PATENTS.

ALPHABETICAL LIST OF PATENTS, FROM JULY 1ST TO DEC. 31, 1840.

*** In those cases where another name is referred to, both are parties to the same patent.

Aeriform and other fluids,—see Condensing, A. H.
Agricultural implements,—see Machinery, M. C.
Agricultural implements,—see Machinery, B. E.
Agricultural implements,—see Reaping, D. J.
Agricultural implement,—see Machinery, W. J. S.
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Air, or other gas engines, Oct. 15, Newton, W. 4
Air to lamps, Nov. 7, Halpin, G. 4.308
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Apparatus for burning fatty matters, or a lamp, Sept. 7, Motley, T. Vol 4-164
Apparatus for measuring and folding fabrics, Nov. 10, M. Kinley, W. 4.325
Atmosphere,—see Carriages, P. T.
Beds, mattrasses, sofas, cushions, &c., July 30, Bachelard, J. L. Vol 4.84
Bell pulls,—see Nohs, J. T.
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Cards, for carding cotton, &c., Oct. 1, Horsfall, W. 4
Carding engine, Dec. 23, Jones, J. Vol 5.5
Carriages,—see Railways, B. J.
Carriages, Sept. 24, Maugham, J.
Carriages,—see Railroad, &c., B. E.
Carriages,—see Railroad, P. R.
Carriages, and appendages thereto, Dec. 28, Adams, W. B. 5-19
Carriage machinery,—see Railway, B. J.
Carriages propelled by atmosphere, Sept. 22, Pain, Thomas.
Carriage wheels, rails, and chairs, for railways, August 7, Smith, A. Vol 4.100 -

Regulator for rotary engines, water-wheels, &c., Aug. 27, Hick, B. Vol 4.150
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Ships' velocity—see Measuring, W. T. R.
4.340 — Ships, &c. from foundering, Nov. 21, Bakewell, J. R.
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Slating,—see Roofing, T. S.
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Spanners,—see Screws, S. T. R.
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Steam-engine, July 29, Irwin, R. Vol 4.84
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Sugar-cane mill, and making sugar, Dec. 2, Robinson, J. 4.372
Sulphate of iron and magnesia,—see Pigments, G. J. B.
Sulphur from pyrites, July 8, Harvey, J. 4.52
5.3 — Tables and other furniture, Dec. 23, Murdock, J.
5.5 — Tanks, &c., of slate, stone, &c., Dec. 23, Coles, R.
Tannin and gelatine, Nov. 25, Webster, W. H. B.
Taps for fluids, Dec. 2, Cowell, H. B. 4.373
Thrashing machinery, &c., Oct. 1, Mackelan, F. P. 4.229 — W. Cooper 4.199
Tinning Tinning metals, Sept. 17, Braithwaite, G. M. 4.197
Tools for planing, &c., metals and other substances, Nov. 25, Baths, N. 4.358
Tools for cutting and shaping metals, &c., Nov. 17, Spear, J. 4.341
Tubes and pipes,—see Coating, E. R. F.
4.405 Turn-tables for railways, Dec. 18, Hancock, E. R.
4.310 — Turning apparatus, &c., Nov. 5, Paterson, G. D.
4.373 — Types set up for printing, Nov. 27, Rosenberg, F.
Valves,—see Pistons, P. C.
Vegetable, animal, and other substances preserved from igniture and decay, Aug. 11, Wetterstedt, Baron C. Vol 4.116 4.374
Vegetable preparation,—see Edible, H. C.
Vegetable substances preserved, Aug. 8, Edwards, D. Vol 4.116
Vessels, measuring speed of,—see Machinery, J. J.
Vinegar, making, Aug. 1, Troubat, Felix. 4.99
Water-closets, Nov. 2, Robson, J. W. 4.245
Water-closets and stuffing-boxes for pumps, and cocks, Aug. 3, Beitson, W. 4.99 373
Weaving,—see Designs, G. H. 4.373
Weaving apparatus, Oct. 7, Davies, J. 4.246
Weighing machines, Sept. 10, Freeman, M. 4.181
Weights, raising and lowering,—see Machinery, G. J.
Wheels,—see Railroads, P. R.
Wheels (extension, seven years), Oct. 22, Piper, T.
White-lead, Dec. 16, Wildes, G.
White-lead, Sept. 19, Pattinson, H. L. 4.182
Windows, cleaning,—see Fire-escape, R. J.
4.100 Wire-ropes and machinery, Aug. 7, Newall, R. S.
Wood,—see Cutting or sawing, R. T.
Wood, producing an uneven surface on, Nov. 25, Wood, H. W. 4.358 4.98
Wool, preparing, Dec. 9, Pierce, W. 4.390
Woollen-cloth, &c., Sept. 21, Hirs, Williams. 4.198
Woollen, &c. fabrics, and machinery, Sept. 21, Williams, T. R. 4.198
Woven goods,—see Mangling, &c., U. H.
Wrenches,—see Screws, S. J.
Writing, machinery for teaching, Sept. 17, Poole, W. 4.197
Yarns,—see Dressing, H. J.
Yarns,—see Cotton drawing, W. F. B.

BRITISH PATENTEES.

ALPHABETICAL LIST OF PATENTEES, FROM JULY 1ST TO DEC. 31ST, 1840.

Adams, William B., Carriages, and appendages thereto, Dec. 28. 5.19
Adcock, Henry, Condensing and evaporating aeriform and other fluids, Dec. 30. 5.21
Almonde, Otto C. Von, Mosaic work from wood, Nov. 12. 4.324
Amos, Charles E., Paper-making, Nov. 10. 4.325
Ashton, John, Hat-bodies, Nov. 21. 4.340
Bachelard, John L., Beds, mattrasses, sofa-cushions, &c., July 30. Vol 4.84 Vol 5.43
Baillie, Benjamin, Locks and fastenings, Dec. 23.
Bakewell, Joseph R., Ships, &c., from foundering, and raising sunken vessels, Nov. 21. 4 340
Barker, Joseph, Gas-metres, Dec. 23.
Barnett, George, Fastenings for wearing apparel, July 11. Vol 4.51
Barratt, Thomas, Paper-making, Nov. 25. 4.357
Baths, Nathaniel, Tools or machinery for planing, &c. metals and other substances, Nov. 25. 4.358
Baylis, Charles W., Pen, metallic, and pen-holder, Dec. 16. 4.405
Beale, Joshua T., Steam-engines, July 10. 4.51
Beathie, Joseph, Locomotive engines, carriages, chairs, and wheels for railways, Dec. 16. 5.22
Bedford, William, Framework-knitting, Sept. 17. 4.199
Beitson, William, Water-closets, and stuffing boxes for pumps, and cocks, Aug. 3. 4.99
Bennett, Joseph, Machine for cutting or tearing rags, hay, &c., July 29. Vol 4.84 4.309
Bergue, Charles de, Reeds used in weaving, Nov. 7.
Berry, Miles, Looms for weaving, Nov. 27. 4.373
Berry, Miles, Propelling ships, &c., Aug. 14. 4.117
Bingham, James, Compositions to imitate ivory, bone, pearl, &c., Sept. 3.
Birch, Eugenius, Railroad, also engines and carriages, Nov. 12. 4.325 4.84
Blaxland, George, Propelling ships, &c., Nov. 28.
Bodmer, John G., Spinning, &c. cotton, wool, &c., (extension, 7 years), July 29.
Botton, Charles, Gas-metres, Dec. 16. 4.405
Bowra, Edward, Boas, muffs, cuffs, flounces, and tippets, Oct. 1. 4.230
Boydell, James, Railway and other carriage machinery, Nov. 2. 4.293 4.197
Braithwaite, George M., Tinning metals, Sept. 17.
Buchanan, John, Railway or other carriages, Dec. 28.
Budding, Edward, Machinery for cutting vegetables, &c., Oct. 15. 4.262
Church, William, Fastenings for wearing apparel, and machinery for same, Aug. 27. 4.150
Clark, George D., Purifying tallow, fat, oil, &c., Nov. 5. 4.309
Clarke, John, Hydraulic pump, Nov. 5. 4.308
Clark, Thomas, Locks, latches, &c., Oct. 22. 4.277
Clay, John,—see Rosenborg, Frederick. 4.373
Clyburn, Richard,—see Budding, Edward. 4.262
Coles, Richard, Tanks, &c., of slate, stone, &c., Dec. 23. 5.5
Coltman, William,—see Wade, Joseph. Vol 4.165
Condie, John, Springs to railway and other carriages, Nov. 27. 4.358
Cordes, James J.,—see Locke, Edward. Vol 4.67
Cowell, Henry B., Taps for fluids, Dec. 2. 4.373
Cox, John, Coke ovens, &c., Nov. 21. Vol 4 83
Croll, Alexander A., Gas making and materials, July 29. Vol 4 84
Crofts, William, Lace and loop machinery, Nov. 7. 4.309
Daft, Thomas B., Inkstands and inkholders, Aug. 1.
Daubenay, Henry C., Paddle-wheels, also for mills Nov. 25. 4.357
Davies, John, Weaving apparatus, Oct. 7. 4.246
Davis, James, Heat applied to steam-boilers, Dec. 16. 4.405
Davis, Thomas J., Paving roads, &c., Aug. 8. Vol 4.115
Deacon, James, Glass chimneys for lamps, Nov. 19. 4.34
Dean, Alexander,—see Evans, Evan. 4.212
Delbruck, Charles, Gas to the purposes of heat, Sept. 10. 4.181
Dent, Edward J., Clocks, &c., Sept. 10. 4.180
Dickinson, John, Paper-making, Dec. 23. 5.4
Dod, Charles, Plate-glass, marble, stone, &c., Nov. 12. 4.183
Dodd, Edward, Pianofortes, Nov. 7. 4.309
Donisthorpe, George E., Combing wool, &c., Nov. 7. 4.310
Draper, Samuel, Lace, ornamental, and looped fabrics, Sep. 17. 4.198
Ducie, Earl of,—see Clyburn, Richard. 4.262
Duncan, John, Machinery for reaping, &c., grass, &c., Nov. 2. 4.294
Edmunds, Richard, Drilling machines, Oct. 22. 4.277
Edwards, Downes, Preserving vegetable substances, Aug. 8. Vol 4.116 4.308
Edwards, Henry H., Evaporating apparatus, Nov. 5.
Emmerson, Richard F., Coating to iron pipes and tubes, Nov. 3. 4.308
Erard, Pierre, Pianofortes, Sept. 24.
Evans, Evan, Mills for reducing grain, and dressing or bolting machine, Sept. 24. 4.212
Fairbairn, Peter, Heckling, combing, &c. fibrous materials, July 13. Vol 4.68
Fitt, James, Mechanical power, Oct. 7. 4.245
Fontain Mareau, Pierre Conte de, Covering and coating metals, &c., Aug. 15. Vol 4.132
Fourdrinier, Henry and Edward N., Steam-engine, and propelling apparatus, Sept. 17. 4.199
Freeman, Mark, Weighing machines, Sept. 10. 4.181
Freeman, William, Paving roads, &c., Sept. 7. Vol 4 164
Galloway, Elijah, Propelling railroad carriages, Nov. 2. 4.293
Gerish, Francis W., Fire-escape, or for a ladder, Aug. 8. Vol 4.116
Getten, Joseph, Purifying whale oil, July 11.
Gibson, John,—see Muir, Thomas. 4.212
Gilbert, George A., Motive power, Sept. 10. 4.183
Goodacre, Robert, Raising heavy loads in carts, &c., Sept. 10. Vol 4.180
Goodman, George, Mourning and dress pins, Sept. 24.
Graham, Hugh, Preparing designs, and dyeing the materials, also process of weaving, Dec. 16. 4.373
Grant, Thomas T., Fuel making, July 13. Vol 3.215
Gregson, John B., Pigments, also sulphate of iron and magnesia, Dec. 23. Vol 5.4
Grellett, Charles, Potatoes prepared and dried for food, Nov. 25. 4.357
Grylls, John, Machinery for raising and lowering weights, Dec. 31. 5.20 4.308
Gwynne, George, Candles, also oils and fats, Nov. 5.
Haley, Joseph, Lifting-jack for heavy bodies, also for packing wood, &c., Dec. 31. 4.390
Halpin, George, Air to lamps, Nov. 7. 4.308
Hancock, Elias R., Turn-tables for railways, Dec. 18. 4.405
Hancock, James, Raising water and other fluids, Oct. 15. 4.262
Handford, Charles, Edible vegetable preparation, Sept. 21. 4.198
Hannah, James L., Fire-escapes, Nov. 25.
Hannuic, Paul, Governors to steam-engines, Sept. 10. 4.180
Harvey, James, Extracting sulphur from pyrites, July 8. Vol 4.52
Haughton, John, Railway apparatus against accidents, Nov. 24. 4.358
Hawkins, John J., Buttons, and affixing them, Aug. 8. Vol 4.116
Heaton, John, Dressing yarns of linen, cotton, &c., Nov. 12. 4.324
Hebert, Luke, Needle-making, Aug. 17. Vol 4.132
Hensman, William, Ploughs, Dec. 31. 5.21
Henson, William, Machinery for producing fabrics, &c., Nov. 19. 4.341

Cooper Wm Thrashing Machines 4.199

Hick, Benjamin, Governors of rotary engines, water-wheels, &c., August 27. 4.150
Hirst, William, Woollen cloth, &c., Sept. 24.
Hodgson, James, Cutting and planing wood for moulded surfaces, Aug. 3. Vol 4.99
Holbeck, Louis, Producing oil, Dec. 31.
Holmes, William D., Naval architecture, &c., security from shipwreck, Sept. 3. Vol 4.164
98 Holmes, William D., Steam-engines, &c., Aug. 1.
Horne, Thomas, Hinges, Sept. 3. Vol 4.165
Horsfall, William, Cards for carding cotton, &c., Oct. 1. 4.229
Houldsworth, Henry, Railway carriages, and seat for carriages, and other purposes, Sept. 10. 4.182
60 Howard, Samuel, Boilers and furnaces, Aug. 8.
Hullmandel, Charles J., Plate and stone prepared to give impression—Lithographic apparatus, Nov. 5.
Hutchins, William H.,—see, Bakewell, Joseph R.
Jefferies, William, Copper spelter and metals from ores, July 1. Vol 4.50
Johnston, John, Machinery to measure the speed of vessels in water, also for time, Sept. 24. 4.212
Jones, John, Carding-engine, Dec. 23. 5.5 – 4.359
Joyce, Thomas, Nobs, bell pulls, &c., for dwelling houses, Oct. 1. 4.230
Irwin, Robert, Steam-engines, July 29. Vol 4.84
Kempton, William H., Cylinder for printing calico, &c., Dec. 30.
Kempton, William H., Lamps, Dec. 31. 5.20
Kirk, Henry, Substitute for ice for skating, &c., Nov. 5.
Kurtz, Andrew, Furnaces, Nov. 5. 4.310
Lambert, John, Soap-making, July 15. Vol 4.60
Lawes, Thomas, Feather-dressing, &c., machine, Nov. 10. 4.325
Leconte, Louis, Fire-proof buildings, July 9. 4.51
Lindo, Abraham A., Railway apparatus and carriages, Dec. 18. 4.400
Locke, Edward, Rotary engine, July 18. Vol 4.67
Lockett, Joseph, Engraving cylinders, &c., for printing calicoes, &c., Aug. 27. 4.150
Mabley, William T., printing, embossing, &c., Dec. 17. 4.400
Mackelan, Frederick P., Thrashing machinery, and power transmitted, Oct. 1. 4.229
3 Mackelsau, Frederick P.,—see, Murdoch, James.
M'Kinley, William, apparatus for measuring and folding fabrics, Nov. 10. 4.325
M'Murray, William, Paper-making, July 1. Vol 4.21
Macrae, Colin, Rotary engines, &c., Aug. 5. 4.99
98 Mannoury, Pierre M., Musical instruments, Nov. 5.
Maughan, John, Carriages, Sept. 24.
May, Charles, Machinery for cutting straw and vegetable matters, July 6. Vol 4.35
Mechi, John I., Lamp apparatus to carry off heat, Nov. 10. Vol 4.51 4.341
Mill, William, Propellers and steam-engines, &c., Sept. 21. Vol 4.197 4.405
Molyneux, James, Dressing flax and tow, Dec. 16.
Motley, Thomas, apparatus for burning fatty matters, Sept. 7. Vol 4.164
Muir, Thomas, Cleaning silk, &c., Sept. 24. 4.212
Murdoch, James, Tables and other furniture, Dec. 23. Vol 5.3
Newall, Robert S., Wire ropes and machinery, Aug. 7. Vol 4.100
2 Newton, William, Air or other gas engines, Oct. 15.
2 Newton, William, Rigging of ships, &c., Dec. 31.
Noon, George E., Pumps and engines for beer, &c., Aug. 3. Vol 4.100
Olsgowski, Andrew P. de, Level for ascertaining the horizon, Dec. 16. 4.405
Orange, John E., Ropes and cables, yarn apparatus, Nov. 2. 4.293
Pain, Thomas, Carriages propelled by atmosphere, Sept. 22. 4.165
Palmer, George H.,—see Perkins, Charles. 4.373
Palmer, William, Ploughs, July 11. Vol 4.51
Parker, Charles, Looms for weaving linen, &c., Oct. 22. 4.270
Parker, Samuel, Purifying, &c. oils and apparatus for burning fatty substances, Sept. 10. 4.181
Parkes, Joseph, Buttons, Dec. 31. 5.21
Parkin, Thomas W.,—see Wilde, Elisha.
Paterson, George D., turning apparatus, &c., Nov. 5.
Pattinson, Hugh L., White-lead, Sept. 10. 4.182
Payne, Charles, Salting animal matters, Oct. 13. 4.291
Peirce, William, Preparing wool, Dec. 9. 4.390
Perkins, Charles, Pistons and valves, &c., Nov. 28.
Pettit, Robert, Railroads and carriages, and wheels for the same, Oct. 15. 4.262
Philippe, Frederick T., Printing cotton, silk, &c., Nov. 25. 4.356
Pillbrow, James, Steam-engines, Sept. 10. 4.182
Pinkus, Henry, Constructing roads or ways, Oct. 15.
Pinkus, Henry, Motive power to machinery and carriages, Sept. 24.
Piper, Thomas, Wheels (extension, 7 years), Oct. 22,
Poncy, John P. J., Clocks and chronometers, Aug. 13. Vol 4.117 – Vol 4.21
Poole, John D., Evaporating and distilling, July, 2.
Poole, Moses, Fire-arms, &c., July 18. Vol 4.67
Poole, Moses, Writing, machinery for teaching, Sept. 17. 4.197
Pope, Francis, Locomotive and other carriages, Nov. 24. 4.356
Pumphrey, Josiah, Hooks and eyes, Nov. 2. 4.293
Rapson, John, Paddle-wheels, Nov. 5. 4.308
Reynolds, Oliver L., Framework-knitting, Nov. 25.
Richards, Theophilus, Cutting or sawing wood, Aug. 5. Vol 4.101 4.197
Richardson, Walter,—see Braithwaite, George M.
Riddle, Gabriel,—see Piper, Thomas.
Ritchie, George,—see Bowra, Edward. 4.280
Roberts, James, Fire-escape, also for cleaning windows, July 18. Vol 4.67
Roberts, Robert, Casehardening iron, Nov. 25.
Robinson, James, Sugar-cane mill, and making sugar, Dec. 2. 4.372
Robson, John W., Water-closets, Nov. 2. 4.245
Rosenborg, Frederick, Types set up for printing, Nov. 27. 4.373
Sanders, John,—see William, Williams. 4.99
Saunders, William, Paving streets, &c., Aug. 3.
Schroeder, Herman, Filters, Nov. 2. 4.293 – 101
Scott, Henry, Ink-making, Dec. 31. 5.20
Sewell, Thomas R., Carbonic acid from mineral, Dec. 31. 5.21
Shaw, Joshua, Discharging ordnance, fire-arms, &c., Nov. 17. 4.341
Simpson, Alexander H., Observatory, platform, or fire-escape, Nov. 5. 4.310
Simpson, Alexander H., Pump apparatus, Dec. 9.
Smith, Andrew, Carriage-wheels, rails and chairs for railways, Aug. 7. Vol 4.100 – 4.148
Smith, Charles, Lime and cements, &c., Aug. 27.
Smith, Junius, Furnaces, Nov. 25. 4.357
Spear, John, Tools for cutting and shaping metals, &c., Nov. 17. 4.341
Spencer, Thomas,—see Wilson, John. 4.245
Stevens, Alexander, Chuck for turning, &c. Nov. 19.
Steward, John, Pianofortes and musical instruments, Dec. 16.
Stirling, James and Robert, Air-engines, Oct. 1.
Stubbs, Joseph, Screws, wrenches, and spanners, Dec. 31. 5.21 4.99
Taaffe, James, Roofing and slating houses, Aug. 17.
Talbot, William H. F., Motive-power, Oct. 1. 4.230
Taylor, Samuel L., Ploughs, Aug. 3. 4.99
Thornton, George, Railways, locomotive engines, and carriages, Dec. 23. Vol 5.4
Todd, Francis, Silver obtained from ores, &c., July 27. Vol 4.83
Travis, Edwin, Spinning apparatus, July 15. Vol 4.60
Trewhitt, Henry, Steam-engines, &c., Aug. 7. 4.100
Troubat, Felix, Vinegar-making, Aug. 1. 4.99
Turner, Edwin, Locomotive and steam-engines, July 6. Vol 4.36
Unsworth, Hugh, Mangling, drying, and finishing woven goods or fabrics, Aug. 27. 4.149
Wade, Joseph, Framework-knitting, &c., Sept. 7.
Wakefield, John,—see Ashton, John.
Walther, David, Purifying oils, fats, naptha, &c., Dec. 23. Vol 5.5
Waterton, Henry, Sal-ammoniac, Aug. 27.
Webster, William H. B., Tannin and gelatine, Nov. 25,
Wells, John, Coke-making, Dec. 28.
Wetterstedt, Baron C., Preserving vegetable, animal, and other substances from igniture and decay, Aug. 11. Vol 4.116
Whitaker, Francis B., Drawing cotton, warping, and yarns, Dec. 31.
Whitehead, James H., Woollen belts, and driving bands, Nov. 2. 4.233
Whitehouse, John, Spring hinges and door springs, Sept. 7. Vol 4.164
Whitworth, Joseph,—see Spear, John. 4.341
Wilde, Elisha, Locomotive and other steam-engines, Nov. 12.
Wildes, George, White-lead, Dec. 16.
William, Williams,—see Taylor, Samuel L. 4.99
Williams, Charles W., Furnaces and boilers, Nov. 17. 4.341
Williams, Thomas R., Measuring the velocity of ships, &c., also of fluids, Aug. 27. 4.149
Williams, Thomas R., Woollen, &c. fabrics and machinery, Sept. 24.
Wilson, John, Engraving by electricity, Oct. 7. 4.245
Wimshurst, Henry, Steam-vessels, power, and propellers, Nov. 2. 4.293
Wood, Henry W., Producing an uneven surface on wood, &c., Nov. 25. 4.358
Wood, Thomas, Paving streets, &c., Oct. 7. 4.244
Worth, John S., Machinery for cutting vegetable substances, July 29. Vol 4.83
Young, John, Nobs, handles, boxes, &c., for the use of house furniture, Aug. 17.

Infringement of a Patent.—In the Court of Chancery on Saturday, the Lord Chancellor dissolved the injunction obtained in the case of Neilson *v.* Fothergill, and two other cases by the plaintiff against different ironmasters, to restrain infringements of his patent for applying heated air in the smelting of iron. His Lordship said, that in all, if Mr. Neilson had a valid patent, he was entitled to the stipulated sum of 1s a ton; but justice might be done hereafter, if an account was kept, and the defendants undertook to deal with the amount as the Court should direct.

Infringement of a Patentee's Rights.—In the Rolls' Court on Thursday the Master of the Rolls granted an injunction against Mr. Howard, of Brentford, to prevent him from selling a patent machine for cutting turnips, &c. It appeared from the statement of counsel, that Mr. Gardner, the plaintiff, is the patentee of an invention for an improvement in machines for cutting Swedish and other turnips, mangel-wurzel, and other roots used for cattle, &c. He obtained the patent in the year 1834, and employed the defendant, who was an ironmonger at Brentford, to sell the machines, allowing him a commission on the sales. The defendant continued to sell the machines and to account to the plaintiff for the profits of the same until very lately, when the plaintiff for the first time discovered that the defendant was manufacturing and exposing for sale machines in every respect similar to those patented by the plaintiff. Some communications had taken place between the parties, but these having led to no satisfactory result, the present motion for an injunction was made.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

Railway Signals.—The following is the code of signals, recommended at the Railway conference last week, which it is intended shall be adopted on all railways:

"*Signals by Night.*—The white light stationary, indicates that all is right; but if waved *up and down*, is a signal to stop; if waved *to and fro*, sideways, to proceed cautiously. The red light is a signal always to stop. *By Day.*—The *red flag* is the signal to stop. The *blue flag* is to stop second class coach trains, luggage, or picking up trains, for the purpose of sending on wagons. The *black flag* is used by plate layers to indicate that the roar is undergoing repair, and that trains must pass slowly. It is to be understood that *any* flag or lamp, of whatever color, *violently waved*, is a signal to stop."

Manchester, Bolton, and Bury Railway.—The report of the directors of the railway, at the late

half-yearly meeting, represents the net receipts for the past half year to exceed those of the preceding by £11,311, arising, partly from increased traffic, and partly from diminished expenditure. The coal traffic in the last half year has greatly increased, without having diminished the coal traffic on the canal. Nine miles of the Bolton and Preston Railway are already completed, and are expected to be opened next month, by which the railway conveyance will be continued to near Chorley. Arrangements have been made to supply the Bolton and Preston Railway Company with engines, carriages, and wagons, for working this portion of their line, until the remaining five miles be finished, which is expected to take place next year.

Proposed Arrangement with the Blackwall Railway.—The directors of the Blackwall Company have made a proposition to Government, which seems to be a very praiseworthy one, and we understand there is every probability of its being taken advantage of. It is to the effect that all steam-boats, inward bound from foreign ports, shall deliver their passengers and luggage at the company's wharf at Blackwall, they (the company) undertaking to have covered vans and trains always ready for the conveyance of them to their warehouses in Fenchurch-street. Government have, it is said, received the proposition favorably, conceiving that, upon the plan pointed out, an immense deal of the smuggling which is now carried on by travellers by steam-vessels may be prevented. The intention is to have officers always ready at the terminus, for the immediate searching and passing of the luggage, by which means at least two hours may be saved, in comparison with the time consumed under the present system. Another most material benefit will be derived from the change. The extortions and abuse of watermen, porters, and petty Custom house officers, and hangers-on of various descriptions, will be put an end to. There seems to be no reason why the passengers generally by vessels coming from foreign places may not voluntarily fall into the measure.—*Morning Post.*

The Great North of England Railway.—On the opening of the Great North of England Railway from Darlington to York, the trains consisted of between 300 and 400 wagons, each having about 53 cwt. of coal, and extending about one mile in length. The largest pieces of coal were, one marked "Pease's St. Helen's New Winning," which contained about 44 cubic feet of coal, and weighed nearly 30 cwt., and another piece, about 30 cubic feet, and weighed about 20 cwt. The trains were about seven hours in performing the journey to York, including stoppages.—*Newcastle Journal.*

Liverpool and Manchester Railway.—The half-yearly meeting of this company was held at Liverpool on Wednesday, and the various details comprised in the report of the directors may be said to possess an unusual interest to the proprietors of railway property generally, as proving, that increased practical experience will enable the managers of these undertakings to decrease very considerably the expenditure in the various departments connected with the working of railways. During the last six months, the average traffic on the Liverpool and Manchester line has been less than usual, in consequence of the generally-depressed state of trade in these districts during the former part of the time. In the loading department there is a deficit of £4,000 as compared with the corresponding period of the previous year; and yet, notwithstanding this deficiency, the net profits of the half-year have increased £7,600 over the same period of 1839. Taking the month of December last by itself, there is an increase of traffic to the extent of 12½ per cent. over the same months of the former year. The total receipts for the last half-year amount to £139,323, and, after deducting all disbursements, there is a net profit to the shareholders of £70,629. This affords a dividend of £5 per share, being to the full extent of 10 per cent. per annum, as allowed by Act of Parliament, and £2 per share on the half year, by way of bonus. After payment of the dividends there will remain £8,772, balance of profit to be carried to the next account. It is a subject of deserved congratulation, that during the last twelve months, 1,052,000 persons have been conveyed on this line, and with but one accident. This one was entirely owing to the recklessness of the individual, who brought it on himself, by jumping out of a second class carriage when at full speed. In regard to the contemplated junction with the Manchester and Leeds line, the directors have not yet come to any definite settlement, but are entertaining the matter with a view to its friendly arrangement. The amount and nature of the traffic expected from the Manchester and Leeds line might possibly require great alterations in the arrangements of the Liverpool line, and therefore it is deemed expedient to wait until the completion of the former, which will be in a few weeks.

The Harrow Inquest.—In the Court of Queen's Bench on Thursday a rule *nisi* was granted to set aside the inquest at Harrow, in which £2,000 deodand had been imposed on the London and Birmingham railway.

Railways in Ireland.—(*From the Dublin Post.*)—In our long experience of public affairs in Ireland we never beheld a more gratifying scene than was presented by the meeting held at the Royal Exchange, Dublin, on Thursday, comprising as it did men of all parties, sects, and conditions—the peer, the landed proprietor, the merchant, the manufacturer, the artisan—all were represented in that crowded and most influential assemblage, and all were unanimous in their determination to promote the establishment of railway communications throughout Ireland, under the control and management of the State. This is a most important step towards the attainment of the greatest blessing which can be conferred upon our country; for railways undertaken by the Government would afford most extensive and lucrative employment during their construction, and, when employed, would become the sure foundation for the rapid advancement of the country, and its future prosperity. It is truly delightful to behold all parties co-operating in such a great object, and thus meeting upon a neutral ground of public utility. Under such circumstances, an appeal to the British Legislature cannot, we think, be made in vain. Upon the Government, in the first instance, will devolve the duty of introducing the subject, and pressing it upon the favorable attention of Parliament. That duty, we have every ground to anticipate, the Government will efficiently discharge; and we cannot bring ourselves to suppose that any insurmountable obstacle will exist in the House of Commons.

RAILWAY ACCIDENTS.

The late Accident on the Blackwall Railway.—Mr. Charles James Booles, the late money-taker at the Blackwall terminus of the railway, died on Saturday from the injuries received by being run against by a train on the 12th inst., as previously stated. The deceased attributed the accident entirely to his own carelessness. The injuries he received were a fracture of the lower jaw, and two wounds on the head which laid bare the scull. He proceeded favorably for a week, when he became delirious, and continued so till death. After the accident the deceased walked to the Poplar station.

Accident on the London and Birmingham Railway.—On Tuesday evening, as the train from Birmingham that arrives at Euston-square at a quarter before seven, was on its way from Cambden town to the London terminus, an accident occurred, fortunately unattended with loss of life or serious personal injury. At the proper distance the breaksmen used every exertion to stop the train gradually, according to their usual practice, but, in consequence of the slippery state of the rails, the breaks had not the least effect. The consequence was, that the train proceeded at an increasing speed until it came in contact with a luggage van that fortunately was on the line of rail, and which alone saved, by its interposition, the carriages and passengers from injury. As it was, the luggage van was driven by the force of the concussion off its springs and wheels in a side direction across the platform amongst the cabs and omnibusses. A second-class carriage, the foremost of the train, was shattered to pieces.

Accident on the Gloucester and Birmingham Railway.—A railway accident of a serious nature occurred on the Gloucester and Birmingham line on Wednesday evening, which we regret to find has proved fatal to one of the company's stokers. The 5 o'clock down train from Birmingham, shortly after passing Eckington, came in contact with a large mass of earth and gravel, which had slipped from the embankment at the side, and fallen across the line. The engine and tender were immediately thrown off the rails, dragging with them the train, which consisted of several carriages. The engine was driven with great violence into the bank, and broken to pieces; but excepting the damage which the springs of the carriages received from the concussion, we believe the whole of them escaped injury. The engineer was thrown to some distance into the road, and so escaped with a few slight bruises; but the stoker, who at the time would seem to have been standing on the platform between the engine and tender, unfortunately fell between the two machines, and had both his legs broken. Information of the accident was immediately forwarded to the station at Cheltenham, whence a fresh engine was despatched to bring on the train. Assistance having been procured, the carriages were got again upon the rails, and the train proceeded on its journey, but did not, in consequence of the delay, reach the Lansdowne station until near 11 o'clock—full three hours after its time. None of the passengers happily sustained the slightest injury. The unfortunate stoker was conveyed to the Gloucester Infirmary, where he expired shortly after his arrival.—*Cheltenham Looker-on*.

Recklessness of a Passenger.—On Saturday last, as the three o'clock train was coming from Cardiff, when it had nearly reached the Llandaff station, and was proceeding at a great rate, one of the passengers jumped out and fell flat on his face. There was a great outcry, every one thinking the foolish fellow had lost his life, but he rose from the ground apparently unhurt, except a cut on his face. Had he fallen back instead of forward, the wheels must have cut him in pieces. The constables were sent after him, and doubtless he will be punished. —*Merthyr Guardian.* [Surely the poor fellow is sufficiently punished by the fall to teach him experience for the future. The public feeling will never sanction the punishment of a passenger who only endangers his own life by his want of care].

FOREIGN RAILWAYS.

Fatal Collision on the Railway near Mechlin.—A collision, attended with fatal consequence, occurred on the railway near Mechlin, on the evening of the 12th inst. The merchandise train, which left Antwerp, was overtaken by the passenger train which left at 6 o'clock in the evening, and suffered so violent a collision that one of the passengers in the last carriage was thrown on a bank, and had both his legs broken, and died on the following morning. Three of the guards received wounds and contusions, none of which, however, were serious. A strict inquiry into the conduct of the engineers was instituted, the result of which has been the singular discovery, that the accident was in some degree occasioned by the number of precautions taken to prevent it. Thus, for example, the train of merchandise preceding the one occupied by the passengers on the same rail had two engines, in order that its progress might be unusually accelerated, and that it might not be overtaken by the other; and for yet greater security the conductor had placed a red lantern behind the train, that it might be distinctly seen. An unfortunate chance rendered both these precautions ineffectual. The two engines did not proceed as rapidly as was expected, and at the environs of Mechlin the light from the lantern, being mingled

with that which issued from the coke ovens, could not be distinguished. Thus this unforeseen confusion of lights became rather a source of danger than of safety, on account of the false security that the precaution inspired. When the engineer of the passenger train perceived that he was on the point of striking against the train of merchandise there was not time to prevent the collision. He, notwithstanding, at the hazard of his life, made every exertion to reverse the motion, but the impulse with which the train was moving was too great to be suddenly checked. It therefore struck against the train of merchandise, and caused the death of one of the passengers, while the engineer, who was the most exposed to danger, did not receive the least injury. This is a recapitulation of the facts as they have been stated at length in a report addressed to the Minister of the Public Works. Towards the family of the victim, an old man nearly eighty, the administration have behaved in a manner to make them forget their affliction as much as possible.

Collision on the Leipsic Railroad.—The *Leipsic Gazette* mentions that a collision took place a few days since between two trains on the railroad from that town to Halle. The engineer of one of the trains was killed.

The German papers say, that the difficulties which stood in the way of undertaking a direct railroad from Berlin to Hamburgh have been overcome. As the line had to pass through Lauenburgh, it was necessary to obtain the consent of the Danish Government, which was lately granted, and communicated through the medium of the Danish Commission for the Baltic and North Sea Railroad.

TO CORRESPONDENTS.

The Trapesium Paddle Wheel shall be noticed next week.

Our correspondent in Little Knight Rider Street is requested to call at the office.

The communication from America *is scarcely suitable to the objects of our Journal.*

Several articles prepared for insertion are necessarily postponed to give room for the Alphabetical Lists of Patents and Patentees published this week.

Gratuitous Copies *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"The Inventors' Advocate" *is published every* Saturday Morning, *at* 7 o'Clock; and is regularly issued in Monthly Parts, of which 1 *to* 20 are now Ready.

"The Inventors' Advocate" is also published in Volumes containing the Nos. of every 6 months.

Vols. 1, 2, and 3, handsomely bound, are already published.

THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, JANUARY 30, 1841.

The session of Parliament has commenced, and the notes of preparation for the work of legislation have been already busily sounded; but we see little, either in the speech from the throne or in the notices already given, of intention to legislate for the advantage of manufactures and commerce. The only notices bearing on the subject are those of Mr. Labouchere, for a government bill for the regulation of railways; and, as indirectly connected with the protection of the property of inventors, the copyright bill of Mr. Serjeant Talfourd. On the latter subject, we have this week given, from the French papers, an outline of the project of law submitted by the Minister of Public Instruction to the French Chamber of Deputies, for the protection of authors and draftsmen. The speech of the Minister in introducing the measure, is of more interest than the bill itself; for the principle he lays down, that the right of property to the productions of the mind is the strongest right which can be possessed to property of any kind, would, if carried out to its fair consequences, lead to the establishment of a more effectual law for the protection of inventors, who have even greater claims to public consideration than authors. Should Mr. Serjeant Talfourd succeed in conquering the pertinacious opposition raised against his copyright bill, we trust he will be induced to endeavour to extend the same protection to the products of mind in the branches of industry.

One of the necessary consequences of the introduction of important improvements in any branch of industry, is the temporary distress of those who gained their livelihood by conducting the processes which the recent innovation has successfully supplanted. It is, indeed, a subject of regret, that individual suffering must, almost inevitably, attend the discovery of great mechanical advantages; but the national benefits to be derived from such improvements make it requisite that the disadvantage to the few should be overlooked in the good to the many. The invention of printing, which has tended more than any other to the civilisation of the world, presents a striking instance, nevertheless, of the individual distress occasioned by the introduction of new processes. The numbers of copyists, whose daily bread depended on copying manuscripts, were deprived of the means of existence by the new mode of reproducing copies without any limitation, in an infinitely shorter space of time. The reclamations that were then made against printing, on the ground that it would throw numbers of persons out of employment, have been answered by the event, in a manner the most triumphant. The numbers now employed in the art, and in the various occupations connected with it, outnumber, a thousand to one, those who were engaged in literary pursuits, and in the handicraft of manuscript copying. The invention of the steam-engine, and of the power-loom, are also striking proofs that any great improvement must ultimately be the means of extending employment, as well as of greatly increasing the national wealth; though at first, and on a narrow view of the subject, they might seem to have a contrary tendency.

The system of communication by railways—the great invention of the present day—is now by some attacked on the same plea as was the innovation of printing in the fifteenth century. We regret to find the great talent and power of the *Times* enlisted on the adverse side against this important improvement in locomotion; and, as it appears to us, on little better ground than that alleged by the opponents to printing and the power-loom. On Monday there appeared in the leading columns of that paper a long lament on the injuries which railroads have inflicted on those who have invested money in turnpike securities. The probable decay of the high roads, which were the boast of England and the admiration of foreigners, the great inconvenience to cross-road travellers, from the absence of the accustomed well-plenished and well-conducted inns, the persons thrown out of employment, and the diminished consumption of exciseable liquors, are severally dwelt upon, as evils which either have been, or are about to be, effected by railroad conveyance. Railroads, it is observed, are only beneficial to large and distant towns; whilst all the intermediate ramifications of communication must necessarily be destroyed on common roads, therefore it is impolitic to encourage a system which will impair the efficiency of the general means of conveyance.

The professed object of the article is to advocate the reduction of the stage-coach and post-horse duties, and the duties on carriages let for hire, to the level of the duties charged on railway conveyances; or, otherwise, to raise the latter to

the scale of the former. This is the professed object, but the real animus of the article is directed against railway communication.

It seems preposterous, at the present day, to oppose a means of conveyance, the practical advantages of which—even with all the imperfections incident to novelty—have been for several years experienced and almost universally admitted. Did such an attack come from any other quarter, it would be not worth notice; but when it appears in a paper of such large circulation and great general influence, it demands consideration.

If the object of the writer were limited to the equalization of duties on travelling by common roads and railways, we should be disposed to concur in the justice of the proposition; though, in point of revenue, it might readily be proved that the alleged lower rate of taxation on railways yields much more, in consequence of the increased traffic, than the higher duties on stage-coaches and post-horses ever produced. The plea of loss of revenue, therefore, which is urged against favoritism to railways, must be abandoned. But granting the duties were equalised, and that passengers by stage-coaches were charged duty at the rate of one-eighth of a penny per mile, can it be seriously asserted that stage-coach travelling would thereby be able to come into competition with railways? The difference such a reduction would make in a journey from London to Birmingham, would be little more than one shilling; and were it ten times that amount, the convenience and expedition of railway travelling would outweigh the consideration of a trifling difference of fares, supposing it possible for the stage-coach proprietors to carry passengers at a cheaper rate than railway companies.

But the gist of the charges against railways is, that they draw the traffic from common roads, thereby diminish the value of turnpike securities, and tend to decrease the facilities of road conveyance to those who must continue to have recourse to that means of communication.

It is difficult to deal with a charge of this nature, for it, in point of fact, admits the advantages of railways over common roads; and the principle it would enforce is, that the greater portion of the travelling public must, nevertheless, submit to inconvenience and delay for the benefit of the smaller number. It is clear that if the communication by railways did not offer greater advantages than that by stage-coaches, the traffic would not be withdrawn from the turnpike roads. Is it then meant to be asserted, that this advantageous mode of communication should not be established, because it might diminish the value of property invested in rival undertakings; or might diminish the facilities of conveyance to those who cannot travel by railways? If this is what the *Times* means, it is merely a reproduction of the obsolete arguments against the invention of printing, the power-loom, and all other improvements, which require no answer in the nineteenth century.

That turnpike securities have diminished in value, that the number of coachmen has been reduced, we must admit; but the former effect we believe to be only temporary, and the latter is not a national calamity, considering that railways give employment, and of a higher kind, to a greater number of hands. It may be remembered, that when railways were first projected, their most violent opponents were canal proprietors, who conceived that their interests would be materially affected by the new system of steam communication. The result, after several years experience, has been the opposite of that anticipated. The traffic on canals has increased, owing to the stimulus to internal communication which locomotion by railways has imparted. The same effect may, after a while, be produced on common roads, when the railway system has become more ramified and better organised. Their use will then be the same as that of the branch arteries and veins of the body. They will distribute and collect to, and from, the adjoining or more distant parts of the country, the supplies which the great channels of communication either bring or carry away. The rapidity of circulation, flowing through the main arteries, will then be communicated to the most distant points; and will impart fresh vigor and increased animation to every member of the body politic.

NEW INVENTIONS.

NEW ROTARY STEAM-ENGINE.

A rotary steam-engine, which, for simplicity of action, exceeds any that have hitherto been contrived, and promises to render this mode of applying steam-power really available, has been very lately introduced, and is now at work. It consists of nothing more than the application of Barker's mill to steam-power, instead of water. All the machinery consists of a short hollow shaft, to which two hollow arms are fixed, the shaft being so contrived as to revolve with the least friction that is compatible with keeping the joint steam-tight. The arms are enclosed in a circular box, to confine the escaping steam, which is let off through a large pipe. The end of each arm is bent, so that the steam, as it rushes out of them, re-acts on the air in the direction contrary to that of the rotation of the arms. It will be seen, that the movement of this engine depends entirely on the re-action of the air against the force of the steam as it issues from the apertures at the ends of the revolving arms. The circular box, though intended only to confine the escaping steam, must be, in our opinion, of great use in the action of the engine, as it prevents the steam from condensing when it acts in the atmosphere, which has been the cause of failure in many other rotary engines. Of course the principal question will be, whether the quantity of steam used to keep up the action is greater or less than is equal to produce the same effects by the ordinary engines. If it prove successful,—and we believe that, so far as the experiment has been tried, it is found to be eminently so,—this simple machine will effect a complete revolution in steam-power, the consequences of which are incalculable. This rotary engine is now employed in turning a number of grindstones in the workshops of Mr. Smith, of Castle-street, Cow Cross-street. It has, we understand, been inspected by several engineers, who expressed themselves astonished at the extraordinary power developed by the simple apparatus.

IMPORTANT DISCOVERIES IN NAVIGATION.

We have received from a Correspondent in Yorkshire, of great respectability, the following communication, relative to some discoveries that have been made by a gentleman in that county, which well deserve consideration. It always gives us pleasure to be the medium of making known the efforts of inventive genius, which, owing to the circumstances or retired mode of life of the inventor, would otherwise be lost:—

"A lover of the promotion of science, conceiving the following article worthy of publicity, requests for it a place in your columns.

"A Yorkshire clergyman, of my acquaintance, of exemplary character and great mechanical genius, assures me of his having made the following important discoveries:—

"First, that he has invented a scheme, whereby telescopic observations may be made on the heavenly bodies at sea, long sought after in vain, *with the same accuracy as on land.*

"Secondly, that he has invented a plan, on quite a new principle, to propel vessels of any burden by steam at sea, *to the saving of coal from at least one-third*, compared with the present system of paddle-wheels; *to a far greater amount*, according to the circumstantial position of the machinery; or, if the same power of steam be kept up in his system as in the present one, to proportionally accelerate the vessel in her progressive motion. Besides these important advantages, he adds, that his plan will act with equal effect applied to a ship under sail, *without any obstruction from her heeling*, or under any alteration in her draught of water from increase or diminution of cargo; and that it will also remedy the tossing of water, so unpleasantly experienced under the present system. While steam continues to be the moving power, he conceives that such plan would bring steam navigation to the highest state of perfection: but,

"In the third place, he says, that he entertains no doubt at all of steam power becoming superseded, with most of its expensive attendants, and that he believes it within his reach to discover the principles of such a superseding power, but is not at present at liberty to say to what degree it may be brought to extend.

"Such was the conversation that recently took place between me and my friend; and being, I conceive, not undeserving of publicity, will, I trust, be thought worthy the attention of some or other of your readers. In intimating to my friend, how remiss he seemed to be in not making his discoveries more publicly known, his reply was, that they being formed on quite new principles, would require, in order to an apt adjustment of their parts for general use, experiments to be made upon them, and that these would have of necessity, from his advanced age as well as official situation, to devolve upon others; in which case, a full disclosure of all the secrets must be made, which, according to information obtained, is contrary to the law of patents: upon which considerations he had almost dropped the matter, till he should obtain clearer information respecting such law. And, indeed, had he felt inclined to carry out the inventions mentioned in the two first clauses, which he feels satisfied to be clearly and fully demonstrated, to actual experiment, the long and most intense exertion of mind, which may easily be imagined, to have been required to mature them, has so debilitated his constitution as to forbid him undergoing that further exertion which must be wanted to see the necessary adaptations completed.

"Should this meet the eye of any of the scientific part of the community, and be thought deserving of attention, the inventor would request the favor, through the medium of this paper or otherwise, of their candid opinion of such schemes, on a supposition that each of them be found capable of accomplishing the end proposed, as well as of their pointing out what they consider the best plan for him to adopt, under his intimated circumstances, in order to produce them to the world.

"X. Y. Z."

SUBSTITUTE FOR ICE FOR SKATING AND SLIDING.

(From the Liverpool Mercury.)

Our readers may recollect that we recently called their attention to the announcement of a patent lately enrolled for the invention of a substitute for ice for skating, and that we at the same time stated that Mr. Dolier had long previously to that announcement directed his attention to the same subject, with very fair hopes of succeeding. Many persons doubt the practicability of forming any tolerable substitute for ice adapted for the operations of skating or sliding; but for our own parts, reflection on the subject has led us to believe that the discovery of such a substitute is quite practicable; and, according to report, the experiments made by Mr. Dolier, on a small scale, have proved that a substance may be found on which the ordinary evolutions of the skater may be performed with pleasure and facility. Several conditions are, however, indispensable to the successful accomplishment of this problem. The surface upon which the evolutions are to be made must be as slippery, if we may use the term, as ice, or as nearly so as practicable; and, at the same time, must yield in some degree to the blade or edge of the skate, so as to afford a fulcrum for every lateral stroke of the skater. This would not be the case if the surface used as a substitute for the ice were of polished metal, as hard as the blade or edge of the skate, as there would be no purchase for the foot on taking the lateral stroke, and the feet of the skater would be apt to fly off in different directions, to the imminent risk of producing a rupture or some dangerous sprain, attended with a prostration of the skater. It is necessary, therefore, that the surface which is to serve as a substitute for the ice should be slightly penetrated by the skate at every stroke, as the common ice is with the present skate iron; in other words, the surface to be skated on must be more penetrable or yielding in its texture than the blade or edge of the skate. For this reason, we would suggest that the blade of the skate for the new process should not be made of steel, but of some very hard wood or other substance, which, whilst it would slightly penetrate the surface to be passed over, would not cut it, but simply make a temporary furrow, which, if the surface were somewhat elastic, would in some degree recover its plane after the skate had passed over it. From specimens we have seen on a small scale, we are inclined to believe that a cheap, smooth, and desirable surface can be formed as a substitute for ice, upon which the skater may progress rapidly straightforward, whilst it will yield a little to the skate blade in the lateral stroke without slipping sideways; and if these requisites can be combined, as we believe they may, we can see no obstacle to the success of this new gymnastic recreation. The best form of the skate would soon be determined by a few experiments, when the skating surface is completed. But whether we shall ever live to see a pretty tolerable substitute for ice for skating realised, or whether some unforeseen obstacle may baffle the expectation, there is one thing of which we are quite certain, and that is, of the practicability of enjoying all the pleasure of sliding by this process in the greatest perfection; and when we bear in mind that this is one of the most favorite and most wholesome games in which boys delight, we do confidently expect to see artificial slides introduced, at no distant period, in all our play-grounds. [The writer of the preceding notice does not seem to have been fully aware of the advantages of using skates formed of other material than steel. We conceive the necessary "hold" on the ice might be gained equally well by making the surfaces of the skates to yield or adhere slightly to the level surface, as if the latter were made the yielding body.]

ON THE PRODUCTION OF HEAT.

BY MR. W. COLEY JONES.

It would be very desirable for the cause of science, if every chemist would publish an account of every new evolution of caloric, as soon as observed, in order to collect a number of new facts, to show the relation heat bears to the other imponderables, and to facilitate its application to the arts. The following cases have occurred in my own practice, which I give as a commencement to a general series:—

1st. On mixing equal parts of Furfurol (a new essential oil, which I discovered in the wheat of commerce) and a concentrated solution of pure potassa, made by decomposing carbonate of potassa with lime, and evaporating the supernatant liquid until it contains one equivalent of pure potassa, and two atoms of water; symbolically thus—

$$\overbrace{KO + CO_2 \,\&\, CaO}^{\text{SOLUTION OF}} = KO + 2\,HO \,\&\, CaO + CO_2$$

a heat of 300° Fahrenheit, is instantly generated, and the contents of the vessel in which the mixture is made thrown into the air, owing probably to the energetic combination of the alkali with the radical of the furfurol, or the decomposition of the essential oil itself, which evidently takes place; for upon neutralising the alkali with an acid, a dark tarry matter appears in the place of the oil; which change will be more fully investigated when the ultimate analysis of the furfurol is completed.

This should be considered as an important source of heat, rivalling the caloric evolved upon mixing sulphuric acid with a proper quantity of water.

2d. When a concentrated solution of chloride of zinc is mixed with a strong solution of pure ammonia, the thermometer rises from 55° to 189°, in which case either of the following changes must take place—water is decomposed, its hydrogen forming muriatic acid with the chlorine, which combines with the ammonia, forming hydro-chlorate of ammonia, and its oxygen with the zinc, forming oxide of zinc, thus—

$$Z + Cl + HO \,\&\, NH_3 = H\,Cl + NH_3 \,\&\, ZO$$

Or upon the ammonium hypothesis, the chlorine of the zinc combines with the ammonium of the oxide, forming chloride of ammonium, and the oxygen leaves the ammonium to combine with the zinc, thus—

$$Z\,Cl + NH_4 + O = NH_4 + Cl \,\&\, ZO$$

Or upon the muriatic acid theory, the muriatic acid leaves the oxide of zinc to combine with ammonia, forming muriate of ammonia, which remains in solution while the oxide precipitates as before, thus—

$$ZO + Cl\,H \,\&\, NH_3 = NH_3 + Cl\,H \,\&\, ZO$$

The chloride of zinc in question was prepared by decomposing sulphate of zinc with chloride of calcium, and evaporating the solution to fusion, and redissolving the fused chloride in the least possible quantity of water. It was very singular, that the chloride formed by dissolving the oxide in hydro-chloric acid, produced less heat, other circumstances being equal. In these two cases, as well as in the one where sulphuric acid is mixed with water, energetic chemical combination evidently takes place—sulphate of water, oxide of zinc, and a combination of the furfurolic principle, being formed.

IMPROVEMENTS IN THE MANUFACTURE OF COAL GAS IN FRANCE.

The following communication from M. Charles Blondeau de Carolles was recently submitted to the French Academy of Sciences.

During the continual progress that is rapidly making in different branches of industry, lighting with gas is the only one which remains stationary; and the gas apparatus now employed in lighting the capital operates in the same manner, and is constructed on the same principles, as those which were established at the first introduction of this new light into France.

Without endeavoring to discover the causes of this circumstance, it cannot be admitted that this manufacture had at the time of its introduction attained the highest degree of perfection. The slightest inquiry will be sufficient to prove that the use of gas is still attended with many inconveniences, which science should endeavor to remedy, encouraged as it is by the daily use of this new method of lighting.

In studying the question of lighting with gas, it is not difficult to discover that the decomposition of the coal is imperfect, the purification of the gas defective, its measurement incorrect, and the regulation of the flame entirely ineffectual. It is to the improvements to be made in these four essential parts of this manufacture that I have directed my attention.

The quantity produced by the coal has not increased since the time gas-light was first produced from this mineral combustible. It must even be acknowledged that we have at the present time made less progress than was made in 1727, when Dr. Hales extracted from 138 grs. of Newcastle coal, 180 cubic inches of gas, (340 litres per kilogramme). At the present time the quantity obtained does not average more than from 230 to 250 litres per kilogramme.

One of the causes opposed to every improvement in the process of the decomposition of coal arises from its having been supposed that during the making of gas, the quality of it is impaired as the quantity increases, and that by this means a compensation is provided; so that they are satisfied with the quantity obtained without endeavoring to increase it. This erroneous opinion is founded on a scientific opinion. It was thought that if the coal produced little gas at a low temperature, it would at least be almost entirely converted into bi-carburet of hydrogen, a very brilliant gas; whilst at a high temperature, the proto-carburetted hydrogen, which was made in much greater quantity, would not produce an equal quantity of light to that obtained from gas in the former case. This explanation cannot be admitted, since it is known that gasses derive their lumiuous property only from the existence of the volatile products which are combined with them, which saturate and which communicate to them, whatever may be their nature, the requisite luminous power. Accordingly it was necessary to ascertain, in the first place, the quantity of gas that could be produced from a kilogramme of coal, in order to know how to proceed in the manufacture; then to determine the circumstances in which the coal should be placed, in order to reach that amount. After having demonstrated that a kilogramme of coal can produce 510 litres of gas, fit for lighting, and that the maximum quantity really produced is only 250, I have proved that this is to be attributed to the defective system of distillation that is adopted, and that, in order to reach the number indicated by the analysis, it will be necessary to place the coal in thin layers, and bring it in immediate contact with the sides of the apparatus, so that its particles exposed to the action of heat may unite in the form of a permanent elastic fluid, which must still be carried over a great extent of heated surfaces, in order to effect the entire decomposition of the bituminous parts which it carries off. It is by putting these principles in operation that I have succeeded in extracting from coal 380 litres of gas per kilogramme, that is 130 more than is commonly obtained.

If the decomposition of coal in the common process is imperfect, there is also much improvement to be made in the purification of the gas produced from it. Besides the sulphuretted hydrogen, which they do not always take the trouble of extracting from it, it also contains ammonia and sulphuret of carbon, which no attempts have ever been made to extract. The lime which is made use of

in the usual method of purification decomposes the hydro-sulphuret of ammonia, unites with the sulphuretted hydrogen, allows the ammonia to escape, which mixes with the gas used in burning, and communicates a disagreeable smell, while at the same time it diminishes its luminous power. This gas should be extracted before it reaches the gasometer. This is what I have accomplished, by making use of coke covered over with a layer of chloride of lime, substances which each possess the power of absorbing ammonia.

The sulphur contained in the coal, beginning to re-act on the carbon at a high temperature, produces a sulphuret of carbon, which can be rendered less volatile by placing it in contact with the sulphur that it dissolves. A layer of sulphur added to a layer of coke, slightly impregnated with chloride of lime, is enough to complete the purification, and to prevent the gas, when burning, from producing sulphurous gas, which mingling with the steam from the water affects the colors exposed to its action.

Having ascertained that all the kinds of gasmetres made use of to indicate the quantity of gas consumed are subject to error from many causes, I have endeavored to discover a more exact method of measuring, by making use of different means to those hitherto adopted. My process is founded on the consideration that the gas used in lighting is saturated with aqueous vapor at the temperature which causes its combustion, so that by absorbing this vapor by means of substances that have a strong affinity to water, such as lime, potass, or chloride of lime, the quantity of gas consumed can be ascertained by the increase of weight in these substances. To discontinue the measure of volumes, and to substitute that of weight, is to follow the plan that has been generally adopted in chemisty; a science to which the use of the balance has rendered so much service by admitting of greater precision in measurement. In short, I have succeeded in regulating the emission of gas by means of an apparatus which is so simple that no difficulty will attend its application to lighting.

FOREIGN INTELLIGENCE.

FRANCE.

NEW FRENCH LAW OF COPYRIGHT.

The Minister of Public Instruction presented to the Chamber of Deputies, in its sitting on the 18th inst., the project of the new law conferring copyright on authors and artists. In the speech with which the law was introduced the Minister sketched the progress of the history of copyright, and stated the principles on which it should be founded. The following observations are well worth the attention of English law-makers, not only when they come to the consideration of the copyright bill of Mr. Serjeant Talfourd, but also in the consideration of tho rights of inventors to the benefits of their labors.

" The property in works of the mind, the right of man to the produce of his thoughts must appear at the first sight property of the most exclusive and incontestable kind. But as this property, even by its nature, has need of special protection, because its value exists by communicating the produce of thought to others, and by communication it is in part alienated, it must therefore be confessed that the property has no absolute form, and that it can only be guaranteed by the statutes of the civil law."

The Minister observes that the value of copyright originated with the art of printing. Previous to that epoch fame was all that authors sought as a recompense, and though they might feel aggrieved by other persons committing plagiary on their works, or by copyists in not giving their words correctly, yet as a question of property the literary productions did not become valuable till after the increased sale of printed works made it a matter worth consideration. The first laws passed in France gave the author and his heirs property in the work for ever. In 1793 a new law was made which limited copyright to ten years after the death of an author. In 1810, by a decree of Napoleon, the right of property was extended to the widow of the author for her life, and to her sons for twenty years afterwards. In this state the law remained, though several attempts have been made to amend it, and the following are the chief provisions of the project of law that has now been submitted to the Chamber of Deputies, after having been discussed in the Chamber of Peers. The Minister of Public Instruction observed, in submitting the project to the Chamber, that he wished the Chamber of Peers had fixed a longer period than thirty years after the death of the author, for the duration of the copyright, and mentioned fifty as being more in accordance with the justice of the case and with the spirit of the imperial decree.

Article 1st. The exclusive right of publishing a work, or of authorizing the publication of it, whether by typography, engraving, lithography, or any other method, is guaranteed to the author during his life, and to his representatives or assigns for thirty years, reckoning from the time of his decease.

Art. 2d. The author has tho power to concede the whole or part of his right, not only for the whole or part of the time during his life, but also for the whole or part of the period of thirty years succeeding his death. When no assignment is produced, it is presumed that the assignment is only for one edition.

Art. 3d. After the decease of the author, the exclusive right for the time he has not disposed of shall be transferred, according to the rules of civil right, to those who are his heirs at the time of his death. The exclusive right shall be considered, in case there are several heirs, as a joint property, unless marriage stipulations exist to the contrary.

Art. 4th. The proprietor, either by succession or by any other title, of a posthumous work, shall possess the exclusive right of publishing it, or of authorizing its publication, during thirty years, reckoning from the first edition. This right shall be transferrable to the heirs or assigns of the said proprietor, within the period of thirty years before stated.

Art. 5th. The editor of an anonymous work, or one who publishes under a feigned name, shall enjoy the exclusive right for thirty years, counting from the day of first publication. If before the expiration of this term the author should prove his property, he shall have the rights guaranteed to him by the articles 1 and 2. If this property be proved after the author's death, and before thirty years have elapsed since the first publication, the heirs or assigns of the author shall possess the exclusive right till the completion of the said period of thirty years.

Art. 6th. The exclusive right of the State over works published by its order and at its expense, shall last thirty years, reckoning from the day when the last part of the work was published. The right of academies and other learned institutions over public writings written in their name and by their direction, shall continue thirty years, computing from the publication of the last volume of the work, reckoning from each volume of their published transactions and memoirs on various subjects. The exclusive right of academies over dictionaries published by them, shall continue thirty years, reckoning from the last edition that has been published.

The other articles of the law relate to dramatic works, music, tho publication of drawings and designs, which are all conformable to the law respecting literary productions in general.

Existing Copyright Law in France.—*Gros and Vallot v. Gavard.*—This was a case of complaint, before the Correctional Tribunal, against the defendant, for unduly engraving and selling plates of the "Battle of Pyramids," one of the best pictures of the late Baron Gros, and now in the Historical Galleries of Versailles. The damages were laid at 2,000f. for Mme. la Baronne Gros, and 6,000f. for M. Vallot. The circumstances of the case were these, that the picture, which in 1814 had been removed from the Salle du Sénat, to one of the upper rooms of the Louvre, was, in 1833, in the possession of General Bertrand, who had agreed to purchase it for 3,000f., from some person not named. Baron Gros, who had lost sight of the picture, on learning this, went to General Bertrand, and obtained leave to have the picture engraved, which privilege he conveyed to his pupil, M. Vallot, who spent several years on the task. Shortly after the civil list claimed the picture, and it was given up by General Bertrand, when it was transferred to Versailles. M. Gavard prepared to have it engraved for his magnificent work, "The Galeries Historiques;" and upon this M. Vallot sent him a legal summons not to do so, as interfering with his privilege. M. Gavard merely promised that he would let M. Vallot's plate appear before his own, which should not be sold separate from his work. When that number of M. Gavard's book which contained the plate appeared, Mme. Gros and M. Vallot brought the present action. The Court decided that as no express stipulation had been made by Baron Gros, on first selling the picture, that he should retain the exclusive right of engraving it, and more especially since it had never legally belonged to General Bertraud, but had passed into a collection like that of Versailles, the object of which was to admit the public to the full enjoyment of the various works of art contained in it, therefore the plaintiffs were not entitled to any damages. The defendant, who had made a counter demand for damages, was also declared not entitled to any, and the costs of the suit were thrown on the plaintiffs.

ACADEMY OF SCIENCES.

At the sitting of the Academy on the 18th inst., M. Gay Lussac and M. Larivière presented a description of some experiments on the decomposition of essential oils by heat. One of the results of their experiments is the production of oils exclusively volatile.

M. Dutrochet concluded the reading of a Memoir on the Movements of Camphor on the Surface of Water.

Messrs. Biot and Arago gave some explanations relative to the rays of the spectrum, which have, according to the researches of M. E. Bequerell, the property of continuing the chemical action of light.* These philosophers are of opinion, that this secondary action is produced by the substance being modified in its chemical composition by the first effect of the rays of light.

A communication from Mr. Talbot to M. Biot was announced by the latter to the Academy, to the effect that Mr. Talbot has succeeded in producing photogenic images on sensitive paper in eight seconds, in a *camera obscura.*

Dr. A. Donné, the reporter of the proceedings of the Academy for the *Journal des Debats*, announced that he proposed sending a communication describing some new facts that he had discovered relative to the composition of the blood. In this communication he proposed to show the curious manner in which the fibrin of the blood is organised in its detached fibres, radiating sometimes from a centre, as exhibited by treating. This solution, he observes, equally preserves the sanguiniferous globules in their essential properties, so that this experiment affords a new and direct demonstration of the state of the fibrin in the blood, and of the separation of the globules.

M. Biot read a long Memoir on the Measure of the forces of Elastic Vapours, commencing at a very low degree of tension.

* See Inventors' Advocate, No. 78.

ANNOUNCED IMPROVEMENT IN THE DAGUERREOTYPE.

The *Journal des Debats* states, that a great deal of anxiety at present exists in Paris relative to the improvement in the Daguerreotype, which M. Arago recently announced to the Academy of Sciences had been made by M. Daguerre. The effect of the new process, it is said, will fix the image on the plate in the space of a second. The philosophical-instrument makers, in particular, are most anxious that the discovery should be made known, for, in the present uncertainty, all orders for Daguerreotypes have been countermanded, and a complete stop has been put to the trade in those instruments, as well as in the plates, which was becoming considerable. Some doubts even are expressed whether M. Daguerre will be able to effect the improvements that have been announced. It is urged that he is neglecting his duty to the public thus to delay the announcement of his discovery, as he has been already paid a handsome sum by the nation for the invention. The writer in the *Debats* observes, that as M. Arago has given his favorable opinion of the new process, he has no doubt it will be found to answer all that is stated. In the meantime the expected announcement has put a stop to further attempts to improve the instrument, as they might be rendered useless by the improvements of M. Daguerre.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING FEBRUARY 1, 1841.

Monday,	Entomological Society	8	P.M.
	Medical Society	8	P.M.
Tuesday,	Linnæan Society	8	P.M.
	Horticultural Society	2	P.M.
	Civil Engineers	8	P.M.
	Uranian Society	8	P.M.
Wednesday,	Society of Arts	7½	P.M.
	Geological Society	8½	P.M.
Thursday,	Royal Society	8½	P.M.
	Antiquarian Society	8	P.M.
Friday,	Botanical Society	8	P.M.
	Royal Institution	8½	P.M.
Saturday,	Asiatic Society	2	P.M.
	Westminster Medical Society	8	P.M.
	Mathematical Society	8	P.M.

ROYAL INSTITUTION.

Jan. 22. Friday Evening Meeting.

On Friday evening last the customary weekly meeting of this extensive body met, for the first time, this session. Mr. W. T. Brande delivered a lecture on the "Improvements in Volta-typing, or Electro-typing." Owing to Mr. Faraday's late illness, that gentleman was not able to do the duty of opening the season as heretofore, and it was with feelings of regret that Mr. Brande took his place on this occasion. It was stated that Mr. Faraday's health was improving, and that he is now resting from his labors with every prospect of soon being able to resume them.

Mr. Brande commenced by stating, that the subject he had selected for the evening's illustration, was touched on by Mr. Faraday at the opening meeting of the last year. Since that time, however, numerous facts had been developed of the utmost importance in the arts. He, therefore, did not hesitate to resume the subject, detailing all its improvements and applications.

The elementary principles of the art were briefly alluded to, and the decomposition of water by means of voltaic electricity explained. Water is composed of oxygen and hydrogen gases (by volume two of the latter to one of the former). By passing the electric current through that medium, the hydrogen goes over to the negative pole, and the oxygen to the positive pole. A similar change takes place when it is passed through metallic solutions. In a copper solution the oxide of copper is decomposed, the oxygen going to the positive pole, and the copper to the hydrogen or negative pole. Examples of common chemical decomposition were shown. A piece of polished iron was immersed in a solution of copper, and if left in the menstruum the copper will be rapidly deposited on the iron, owing to a voltaic action having been set up. But if platinum be inserted in a copper solution, no change or deposit will take place on that metal, until it is made a pole of the battery, when the deposit immediately takes place. Mr. B. used the solution of copper in these illustrations, as he should draw the attention of the audience principally to the uses of that metal as applied in the arts for various purposes; at the same time stating that most other metals may be deposited from their solutions by the voltaic current. If a plate of silver be introduced into a copper solution, the metal will not be thrown down on the silver until a piece of iron is brought in contact with it in the solution, when an electrical action is set up. The various methods were explained used for copying designs of medals, &c., by this process. The most simple is the following:—Take a glass, open at each end (gas lamp glass), over one end of which stretch and tie firmly a thin bladder; into this is to be placed a solution of dilute sulphuric acid, in the proportion of one part of the acid to eight parts of water. This glass is to be then suspended in a solution of sulphate of copper. Take a piece of copper wire; affix to one end a plate of zinc, of sufficient size to introduce into the dilute sulphuric acid in the glass; to the other extremity of the wire is to be soldered the medal to be copied. Place then the object to be copied into the solution of copper, and complete the circle by introducing the zinc into the acid. The electric action takes place from the zinc, through the bladder, to the copper, and the object becomes covered with the deposited copper. Various other means were stated to produce the same end, such as a porous earthenware vessel in the place of the glass and bladder, and also modifications for causing the deposition to be equally distributed over large surfaces. It is requisite, however, that the sulphate of copper should be of the very purest kind, so much of the success of the operation depending upon its purity.

On the table various operations were going on in connection with the subject, including Mr. Smee's battery, in which the plates introduced into the acid are made of platinized silver. Some of the original impressions, in lead, of Mr. Wyan's beautiful medals, were copied. In copying medals or other objects, it is requisite that the side not intended to have the copper deposited upon it should be varnished, coated with sealing-wax, or rendered a non-conductor, by any other means. The great advantage of this mode of obtaining impressions, is the very great accuracy of removing every trace of the artist's graver. At the present time plates are made for the engraver by the process of volta-typing, which are found to possess very many advantages, the metal being much purer than that obtained in any other way—devoid of carbonaceous matters and the oxide of other metals; they are perfectly malleable and tough, and possess many other recommendations of importance to the artist. In front of the lecture table was a large apparatus, with a slate trough, in which the plates were suspended, furnished by Mr. De La Rue. The copying of engraved copper-plates is one of the most important and useful discoveries connected with this art, and one which promises to be of very general use in a variety of ways; and the rapid progress which has in so short a time been made, promises to be of essential service in the many manufactories throughout the country. It was stated that the engraver received for the execution of the subject, "Knox's Preaching," £2,000, and that it will cost £1,000 more to have it re-touched. By means of the volta-type, impressions, taken from the copies, have in many instances been pronounced, by competent judges, to be equal, if not superior, to those worked from the original, and, for the future, the original engraving will doubtless be kept for the purpose only of taking volta-type copies from, which may be obtained at a very trifling cost indeed.

All goes on well as long as metals are employed to take impressions from, but when plaster casts, fruits, and other non-conducting bodies are required to be taken, it is found requisite to cover them with some material possessing conducting power, otherwise no deposit of the copper will take place. Mr. Solly proposed immersing them in a solution of silver, and causing the silver to be deposited in a very fine film, on its surface, by exposure to light. The method which is found most practicable is, to brush the surface with black lead. In order to ensure good connection, a ribbon of copper is placed round the plaster-cast of the coin, and the copper wire soldered to it; but previous to immersing the cast into the copper solution, and before it is rubbed with black lead, it is soaked in wax or tallow, or, according to Mr. Smee, in tallow alone. By this simple means wood-cuts, fruits, seals, leaves, paper, and almost every non-conducting surface, may be correctly copied. For obtaining impressions of wood-engravings, it is found very useful, and is in daily use by Messrs. Vizetelly and Co. Seals are very easily copied by this process, and Mr. Brande related an anecdote of a lady who had received a letter from an elderly gentleman, who prided himself much on a particular seal in his possession, and which letter was sealed with this *particular* seal. In the reply the lady sent, her letter was sealed, to all appearance, with the identical seal much to the gentleman's surprise and probably, annoyance. On the table was a large collection of Syracusan and Athenian coins, which a lady had copied in the space of a few weeks.

Mr. Brande stated that he was indebted to Messrs. Wyan, Vizetelly, Palmer, &c., for the models and specimens on the table.

On the library table were specimens from various volta-typists—Williams' patent lock,—copies of Barton's iradescent buttons,—deposit of the spring at the baths of San Filippo—the new post office stamp, —and microscopic illustrations by Mr. Varley. The lecture announced for next Friday was, "Mr. Brayley on Bitumen."

NUMISMATIC SOCIETY.

EXETER HALL.

Jan. 22. Professor H. H. Wilson, F.R.S., &c., in the Chair.

Mr. Smee delivered a lecture before the society, on the application of electrotyping to medallic copies, accompanied with his battery and various illustrations of different objects in the arts to which it is applicable. A great portion of his lecture was similar to that already reported of Mr. Brande's at the Royal Institution, but Mr. Smee brought forward the following valuable facts:—1. That the application of the old principle of making moulds of valuable coins by fusible metal is extremely injurious to the coins, owing to the presence of a small quantity of mercury usually added to render the metal more readily fusible. 2. That no general rule seems to regulate the deposit upon black lead; shining and dull lead readily taking the deposit, and vice versâ. 3. That a deposit upon a medal itself, although not unattended with the risk of injury, is yet attainable by leaving the coin in a cold place for 24 hours, by which means a film of air is obtained upon the surface, sufficient to hinder the complete union of the deposit with the coin, which otherwise solidifies with the mould into a solid mass. 4. That the great difficulty of obtaining plaster casts without any air bubbles, very much embarrasses the operation. 5. That for the coating of the reverse of the plaster, he prefers the stearine candle, although white wax, bees wax, rosin, and tallow candles are all appliable to the same purpose. Among the objects exhibited before the Society, were the copper matrix of a large engraved plate, formed by electro-galvanic process, models of pomegranates, apples, pears, and various other fruits, baskets, &c., and various impressions from ancient seals and medals. On examining some of the specimens produced, we were struck by the failure of the deposit upon works in high relief, which we must attribute to too great power in the battery, which in works of deep intaglio causes a rapid deposit on the raised parts. A milder solution, viz., of 1 sulphuric acid to 12 parts of water is,

on the contrary, highly favourable to a steady deposit; and wo have seen fac-similes of middle age medallions in it where the relief has been as high as in the ancient works.

SIR ROBERT PEEL'S ADDRESS TO THE WORKING CLASSES.

At the first meeting on the establishment of a Library and Reading Room at Tamworth, last week, Sir Robert Peel, as president of the institution, delivered an excellent inaugural address; in which he showed the advantages which the working classes may derive from education and from the pursuits of science. The following extract from this address, noticing several instances of the elevation of working men to the highest importance by their assiduity and skill, will be read with interest:—

"It will not be our fault if tho ample page of knowledge, 'rich with the spoils of time,' is not unrolled to you. You will not be able to say that 'chill penury' has 'frozen the genial current' of your aspirations for knowledge and distinction. We tell you that hero is access for you to that information which may at the same time facilitate your advance in your worldly occupations and lay the foundation for mental improvement. Do not be deceived by the sneers that you hear against knowledge, which are uttered by men who want to depress you, and keep you depressed, to the level of their own contented ignorance. Do not believe that you have not time (that is what you will hear) for rational recreation. Now, believe me, that it is the idle man who wants time for everything. The industrious man, the man who is persevering in his pursuits, is the man who knows the value of the economy of time, and can find leisure for rational recreation as well as for his attention to his business. Do not believe that the acquisition of knowledge, of such knowledge as we shall offer you, is inconsistent with the success of your worldly pursuits. Depend upon it you cannot exercise and sharpen your intellectual faculties in one branch of knowledge without becoming better men of business in consequence. Depend also upon this, that there is a spirit of inquiry afloat, and that there is a degree of competition requiring the utmost mental activity and exertion. Every steam-boat, every railroad, all the facilities of intercourse, are operating as premiums upon skill and intelligence. They aro shortening the distance between the producer and the consumer; it is not safe for you to remain behindhand; for, depend upon it, if you aro inferior in point of skill, in point of intelligence, in point of general knowledge, to the manufacturers and producers of other districts, those increased facilities of intercourse to which I have been referring will transfer the demand from you to others; and you will be laboring under a fatal delusion if you place confidence in those sneers to which I have alluded, and if you believe that increased intelligence is incompatible with worldly success. On the contrary, I believe that society is now in the position that increased intelligence and increased knowledge are absolutely essential to success in your worldly pursuits. Again, do not believe that science is not a field which is perfectly open to you, whatever may be your occupations and conditions in life. I ask you to consider the names of those men who, at tho present moment, or within your own memory, have acquired for themselves immortal fame by their eminence in the arts and sciences. I ask you to call to mind the names of Mr. Rennie, the great engineer, of Sir Humphrey Davy, of Professor Faraday, of Sir Francis Chantry, of Mr. Wheatstone, the inventor of the electrical telegraphs, and of a hundred others I might name—to consider their first position in life, the difficulties which they had to struggle with, and to search out their early origin—not for the purpose of despising it but of admiring the more, the interval between their origin and the eminence to which they subsequently attained. I have made inquiry upon this subject, and I cannot help reading to you one or two of the answers I have received on the subject of eminent men of the present day who have raised themselves by having had the early opportunity of acquiring knowledge, and by the simple determination to overcome every difficulty that poverty or a low condition might oppose, and to raise themselves from it." [The right hon. baronet here read a letter, dated the 5th of January, stating that Mr. Grainger, the great architect, who had rebuilt the town of Newcastle-upon-Tyne, within a few years, in a style infinitely superior to Regent-street, and whom he (the writer) met at the Duke of Northumberland's a short time since, began his career as a poor mason's boy, carrying a hod of mortar. In the interval between 1834 and 1838 he converted Newcastle from a black and thick cluster of brick to a condition exceeding anything he (the writer) had seen, except in the best parts of Edinburgh. In a postcript to the letter it was also stated, that the late Mr. Harvey, who died at an early age, a Professor at Woolwich, published an excellent work on meteorology: he worked for many years as a carpenter in the dockyard at Plymouth, afterwards became a teacher of mathematics, and was advanced to the professorship above-mentioned.] The right hon. baronet continued, "if you still want any additional proof that the heights of science are not closed to the humblest among you, look around, I say, at this neighborhood. If you go to Lichfield, you see the statue of Dr. Johnson. If you go to Handsworth, you see the statue of Mr. Watt. Look in this very town, and who is the man that is now engaged in extensive works for the purpose of bringing coal and lime under your immediate command? Mr. Stephenson, the engineer. Mr. Stephenson, I am assured, worked for three years as a boy in the meanest capacity in a colliery at Newcastle. He saved £100 by mending the watches of his fellow-workmen for half-a-crown a-piece; and he devoted that £100 to provision for his indigent parents, and set out with a light heart and conscience for the purpose of accumulating more. The result has been that he presents a daily example of encouragement to our eyes, and brought within our immediate contemplation in this town. He presents another example, where, from the lowest origin, merit has been able to raise itself to high eminence and great respect."

SCIENTIFIC MEMORANDA, AND NOTES ON ART.

To detect Chicory in Coffee.—Take a tumbler three parts filled with cold water, and put a tea-spoonful of the coffee into it, then give it a gentle stir. If it be genuine coffee, it will *swim on the top*, very slightly tinging the color of the water; but if chicory is mixed with it, the chicory will sink, and the water appear thick and of a dark color, and the settlement at the bottom will taste as though there was a little Spanish liquorice in it. Thus may be easily detected what proportion is coffee, and what proportion is chicory.

The Archimedes Screw.—The *Liverpool Standard* has devoted considerable space to a clear and circumstantial account of this important invention. "We have much satisfaction," says the *Standard*, "in stating, that the government have at length decided on adopting it into the navy." We are not aware what grounds there may be for such a rumor, but we believe that measures have already been taken on the Continent for the construction of several steamers on the principle of the Archimedes. In Bremen a company has been formed for the construction of several large steamers propelled by the screw, and as soon as the vessels are ready, they are intended to run regularly between that city and New York.

Cambridge University.—The examination for the honors at the Bachelor of Arts' commencement took place on Thursday week. The number of candidates for distinction was 145, but only 117 went into the Senate-house. Mr. Stokes, of Pembroke College, was the senior wrangler; Mr. Jones, of Trinity, second; Mr. Sykes, of Pembroke, third; Mr. Ragland, of Corpus, fourth; Mr. Boultbee, of John's, fifth: Mr. Swainson, of Trinity, sixth, &c. The Lancashire men stood high on the list of honors. Mr. Jones is the son of the Rev. Mr. Jones, of Newchurch, Winwick; Mr. Ragland is nephew of Charles Birch, Esq., Mr. Boultbee, nephew of James Pownall, Esq., and Mr. Swainson, son of Anthony Swainson, Esq., all of Liverpoo.

Inflammable Air from Alcohol.—Messrs. Pelouze and Millon, by passing alcohol over anhydrous barytes, raised to a dull red temperature, found that carbonate of barytes was formed, and carburetted hydrogen given off. This is the first instance in which this gas has been formed artificially. When formic acid is heated with an oxide it is decomposed into carbonic acid, which unites with the oxide, and into pure hydrogen. In this case, the half of the hydrogen comes from the water which has been decomposed by the carbon of the formic acid under the influence of potash. This action it occurred to the chemists mentioned, might also extend to alcohol. They passed carburetted hydrogen procured from alcohol over hydrate of barytes, and obtained hydrogen in large quantities. Napthaline disengaged the same product. The anhydrous oxalates, when heated with barytes, afford, as is well known, carbonic oxide. By substituting hydrate of barytes, hydrogen is procured; carbonic oxide, also, under the same circumstances, affords pure hydrogen; even charcoal itself does the same. Messrs. Pelouze and Millon have drawn the following conclusions:—anhydrous barytes takes up from organic substances all the carbonic acid which their elementary composition permits them to furnish; hydrate of barytes extends the decomposition further, and tends to burn all the carbon, while the hydrogen which proceeds from the decomposition of water is disengaged in a free state.

VARIETIES.

Private Bills.—On Wednesday the House of Commons adopted the following resolutions regarding private bills.—1. That the house will not receive any petition for private bills after Friday, the 12th day of February next. 2. That no private bill be read the first time after Friday, the 19th day of March next; and 3. That this house will not receive any report of such private bill after Friday, the 28th day of May next.

The Iron Trade.—This important trade has been in a most depressed state during the greater portion of the past year, which depression continued to its very close. The new year has, however, opened with a sudden and decided improvement. The demand is brisk, and large sales have been already made at an advance of 5s. to 10s. per ton, the present quotations of Welsh bars on shipment being £7 10s. per ton.—*Monmouth Merlin.*

A quarterly meeting of the ironmasters and others connected with the staple trade of this district took place the week before last, and the reports were of a very favorable character. Several extensive orders are in progress of execution, and the prices manifested a tendency to advance.—*Aris's Birmingham Gazette.*

Coal Pit Accident.—Thursday, in a colliery belonging to Edward Dudley, Esq., Dixon's-green, Dudley, a quantity of coal fell upon five men, two of whom were killed, and the others are not expected to survive.—*Worcester Journal.*

The Sultan's agent in this country has directed to be sent to Constantinople a set of the newly-improved figures invented by Major Wathen to elucidate cavalry movements similar to those lately made for his Royal Highness Prince Albert.

Exports and Imports of Metals in 1840.—The following respecting the exports and imports of metal during the past year are gathered from Mr. Richards's, "annual sheet" of the exports of British and Foreign metals. With reference to our exports, a decrease has taken place to the following extent:—In iron, 5,172 tons; steel, 744 tons; copper, in sheets and nails, 24 tons; tin, in blocks and bars, 1,042 tons; tin plates, 6,764 boxes; lead, in pigs, &c., 357 tons; and in quicksilver, 217,143lbs., while the increase has been confined to cake copper and spelter—the excess of the former being 182 tons, and that of the latter 80 tons. On the foreign metals on which duty has been paid for "home consumption" during the past twelve months, a diminution has taken place in every instance, with the exception of copper, as follows:—Iron, 6,389 tons; steel, 19 tons; lead, 5 tons; spelter, 135 tons; and quicksilver, 103,869lbs. Although the deficiency of our exports in iron appears on the aggregate to amount to only 5,172 tons, the quantity taken by the United States in 1840 was less by 24,712 tons than that of the preceding year; and France and the Netherlands also reduced their imports by 8,014 tons—thus making a reduction in our exports to these three places alone of 27,726 tons. On the other hand, Madras and Calcutta doubled their importation of the preceding year, the quantity for 1839 being 7,877 tons, and, for 1840, 15,715 tons, or an increase of 7,838 tons. Bombay, which took in 1839 only 5,542 tons, advanced in the past year to 10,613—being a surplus of 5,071 tons. New South Wales, in like manner, doubled its quantity, the respective amounts being, for 1839, 2,147 tons, and for 1840, 4,521 tons, or an excess of 2,374 tons—thus equalising to a considerable extent the decrease. With reference to copper, little or no variation has taken place as to the excess or diminution in our exports to the several ports, which, with a trifling difference, are the same as those of the preceding year. In tin plates there has also been a falling off in the United States to the extent of 13,032 boxes, and Trieste 3,390; these, however, have been, in some degree, met by increase at other foreign ports. With respect to lead, the decrease on balance is only 357 tons, but Russia, which in 1839 took 2,150 tons, imported only 488 tons in the past year. France, on the other hand, nearly doubled the quantity of its import, that for 1839 being 1,242 tons, and for 1840, 2,282 tons—giving an excess of 1,040 tons. Spelter (or zinc) shows a decrease in our exports to France of 808 tons, which is explained by that metal being transported direct into that country from Belgium, &c. If, however, there has been a diminution in this instance, it is counterbalanced by an excess in shipments to Madras, Calcutta, and Bombay, the quantity taken in 1839 being 1,588 tons, while the exports for 1840 were 2,627—giving an increase of 1,089 tons.

The Thames Tunnel.—The shaft on the Wapping shore, in which a footway descent is to be made into the Thames Tunnel, is proceeding very rapidly, and as it is built above ground presents a very commanding appearance, and will be gradually sunk. The works below have been for some time suspended, the tunnel having been completed to within the limits of the company's wharf on the Middlesex shore, far beyond the low water mark. When the shaft is completed on the north side the excavations will be resumed; and, as there is now no fear of another irruption, the remaining portion of the tunnel can be completed in a few weeks. It is confidently expected that the tunnel will be opened for foot passengers on or before next July. The arches of the tunnel are in a sound state, and bear evidence of the care taken in the execution of this great and expensive undertaking.

Steam-Engines in Belgium.—At the close of last year there were 1,100 steam-engines at work in Belgium; two-thirds of which were employed in the province of Liege. A large portion of the engines exceed 100-horse-power; many of them are of 150 to 200, and some of 300 horse power. The whole consume together annually 180,000 tons of coal, being nearly one-fourth of the entire consumption of the kingdom. Before the revolution in 1830, the consumption of coal by steam-engines did not amount to one-sixth of what it is at present.

Foreign Trade of London.—A return of the tonnage of shipping that have entered the port of London for the last three years from foreign ports, has been recently published giving the following results:—

	BRITISH.		FOREIGN.		TOTAL.	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
1838	4,339	889,284	1,697	272,808	6,036	1,162,092
1839	4,875	987,485	2,351	354,281	7,226	1,341,766
1840	4,514	924,857	2,217	352,347	6,731	1,277,204

Grimstone's Almanack.—A very neatly got-up little almanack has been published by Mr. Grimstone, the proprietor of the celebrated eye snuff, on a principle quite novel. On one page is printed all the information which those useful publications generally contain, and the reverse gives the reader an opportunity of seeing recorded numerous authenticated accounts of the cures performed by Mr. Grimstone's snuff. It is a very ingenious contrivance for adding to the notoriety which the snuff has already obtained.

ADVERTISEMENTS.

LAW OF PATENTS.

ACTS OF PARLIAMENT.

Patterns,—
27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17. (The last relates to patterns and *models.*)

Patents for Inventions,—
2 and 3 Victoria, c. 67.

Sculptures,—
38 Geo. III., c. 71.

Engravings,—
7 Geo. III., c., 38; 17 Geo. III., c. 57.

Copyright,—
8 Anne, c. 19: 12 Geo. II., (Booksellers' Act), c. 36; 15 Geo. III. (Universities' Act) c. 53; 54 Geo. III. (General Copyright), c. 156.

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THE

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AND JOURNAL OF INDUSTRY;

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UNDULATING RAILWAYS.

A question of great importance in the construction of railways has lately been mooted, viz., whether equal advantages may not be obtained on inclining roads, as on those that are perfectly level. It is obvious, that if this question be answered affirmatively, all future railways may be constructed at much less expense than those hitherto laid down, and the means would thus be afforded of greatly extending that mode of communication.

The principle hitherto followed in constructing railways has been, to adapt the roads to the powers of the locomotive engines; without considering the possibility of adapting the engines to the roads. Acting on this principle, as the engines commonly employed are only capable of drawing a certain weight at a given velocity, it was found necessary to make the roads as level as possible, otherwise the required velocity could not have been obtained, and the train and engines might have been brought to a "dead lock." A more extended view of the capabilities of locomotives is now taken by many engineers, and the plan of working the engines expansively, which we have frequently recommended, has been tried in some instances; though in a very limited degree compared with the extent to which it is susceptible of being carried. Improvements have been recently introduced in the manufacture of locomotives, having for their object to facilitate the working of the engines expansively, by cutting off the steam at any required point, or altogether; yet in none, that we have perceived, do they contemplate enlarging the cylinders to the extent that we think they ought to be enlarged, to render the expansive principle of working fully available. The improvements in locomotives are, however, in rapid course, and we have little doubt that, in a short time, engines will be placed on railroads so constructed that the engineer may at will regulate the power employed to the work to be done—so as to have at command, when the whole force of the steam is used, four or more times the power of the present engines, with the capability of diminishing the force to nothing, when the impetus of the train alone is sufficient to propel it. It is in anticipation of such improvements as these, suiting the power to the obstacles to be overcome, that the question arises whether railroads may not be advantageously worked with locomotives on inclines; for unless there be a better means of adjusting the power to circumstances than at present obtained, the advantages in favor of the level road must greatly preponderate.

Some engineers contend that the force of gravitation, acting in drawing a train down an incline, fully counterbalances the disadvantage of raising a load up the corresponding gradient. Mr. Brunel has carried this principle out so far on parts of the Great Western railway, as purposely to make the road gently undulating, on the supposition that the impetus gained in the descent gives a greater accession of motive power than is lost in the ascent. The experiments made by Mr. Wishaw, also, which are recorded in his recently-published work on railways, go to prove that greater average velocities can be maintained by locomotives on second class gradients than on a level road. All experiments of this kind, however, should be made with the same engine and load, and the quantity of fuel consumed should be accurately stated; otherwise the conclusions must be very fallacious. We suspect that some inaccuracy of this kind pervades Mr. Wishaw's experiments; especially if the engines he employed were not worked expansively.

To put the question of an undulating road in its most favorable light, let us consider the action of a train of carriages on a continuous gently undulating surface, such as Mr. Brunel prefers to a dead level. If the carriages were started from the top of the incline, and there were no resistance from friction of the axles, from the surface resistance of the rails, or from the atmosphere, the impetus given in descending one incline would be sufficient to carry the train to the top of the other similar elevation. It would be then again drawn down by the force of gravitation, to be once more propelled up the succeeding incline, without any power being applied beyond that of gravity. Some attempts to produce perpetual motion upon this principle have been tried, but the loss of power, by resistance, however trifling, was sufficient to prevent the balls employed from rolling to the top of the next incline, and they descended backwards when the first impulsive force became exhausted. The aggregate resistance to the motion is the same, whether the carriages move on a level or down one incline and up another. There is, therefore, no gain in that respect, and the disadvantage attending the incline is this, that the resistance is concentrated within a smaller space, towards the top of the hill, which in a level road is spread equally over every part. When animal power is employed, the undulation of the road to a certain extent may be advantageous, because the variation of the power affords relief in the muscular exertion. When steam-power is used, no advantage of this kind arises, but the reverse; for the engine which, as usually made, is intended to exert one unvarying power, is required in undulating ground to put forth great energy at certain points, and not to exert any at others.

But allowing that the obstacles attending the present construction of locomotives as applicable to undulating roads were removed, and that they could, without any loss of steam, vary their power as occasion required; even then, the advantage would remain with the level road, on account of the regularity of the speed, and of the action of the engine. On any line of great traffic, therefore, where the utmost possible perfection of railway conveyance is required, there need be no regret that money has been expended to make the roads level.

The great advantage which the new views of railway locomotion are calculated to produce, will be perceived in the general extension of the system to parts of the country where the more expensive plan of level roads would have never answered. Were the plan of undulating railroads found to succeed, and the engines were made applicable to the new circumstances, so as to attain nearly the same degree of regular speed without waste of steam, then the construction of a railway would be not more expensive than that of a common road, and no obstacles would exist to the general ramification of railways throughout the kingdom. There would, then, be no need of embankments or tunnels, excavations or viaducts. The rails would be laid down on the surface of the country, and in proportion to the diminution in cost of the roads, would be the diminution in the price of conveyance. The expectations which railways at one time excited would be then in a great measure realised, by the establishment of a much cheaper and rapid means of communication between all parts of the kingdom.

The engineers on the Continent have taken the lead in the adaptation of their engines to the special purposes for which they are intended. We have translated from a Belgian paper a description of a diminutive locomotive intended to work on branch

railways, where the traffic is not sufficient to require the power of an ordinary engine. This locomotive, constructed for the purpose of economy, is capable of maintaining a rapid speed with its diminished load, and is represented to be more completely under command than the large engines, with a numerous train of carriages, can possibly be. We observe, also, that the engineer has adopted the plan of working the steam expansively. We hail improvements of this kind, in whatever quarter they are made, as they indicate clearly enough that engineers are beginning to shake off the trammels which the novelty of the invention of railway conveyance imposed, and are now endeavoring to seek other means, out of the beaten track, of rendering locomotion on railways more extensively serviceable.

DISCOVERIES IN THE WELDING AND WORKING OF METALS.

BY M. J. FOURNET.

It is commonly supposed, that iron and platinum are the only metals which possess the property of welding together without previous melting; yet, when it is seen that two plates of lead, highly polished, acquire merely by pressure such an adherence to each other, that, notwithstanding the imperfection of the contact, a weight of many pounds is necessary to effect their separation, and that after the separation the surfaces present *de veritables etremens*, it must be admitted, that lead ought to be ranked in the number of weldable metals. There is, however, this difference attending it; that instead of requiring a higher or lower temperature, it possesses, under ordinary circumstances, sufficient softness for welding.

The latter consideration has suggested the possibility of treating various metallic powders in such a manner as to bring them to a state of agglomeration, of ductility, and cohesion, without passing through the intermediate process of fusion. I will, nevertheless, except from the number those metals that are brittle, and not malleable, for the stroke of the hammer and pressure would destroy, instead of increase the cohesion. Yet it is possible that circumstances may exist favorable to the cohesion of some of them, since zinc, for example, can easily be drawn into fine wire at a temperature near the point of boiling water; and I once accidentally obtained very pure and ductile bismuth, by a kind of solution, whilst effecting the partial sulphuration of a mass of that metal; and if my memory does not deceive me, M. Chaudit arrived at the same result by a different process. It was evident that, in these operations, it was necessary to avoid the interposition of any substance different from that of the metal to be welded, because they prevent the approximation of its particles; consequently it is also necessary to avoid the formation of oxides in the operation, which produce the same effect as foreign matters. Iron, for example, can be welded, because it is capable of bearing a strong white heat without melting; which fuses the oxidised particles, which the strokes of the hammer expel from the surfaces that come in contact. It is also from the contrary cause, that the fracture of the same iron, when broken with a hammer, and preserving part of its oxide in the interior of its pores, presents nothing but a number of unconnected fibres, and in the interstices a grey dust is perceptible, which is merely the interposed oxide, the existence of which prevents the entire cohesion.

This being admitted, I first operate on pulverised silver, reduced from the chloride by sulphuric acid and zinc. This powder, placed in a crucible, was submitted to a simple annealing, which caused the particles to approach sufficiently close to enable them to bear slight strokes of the hammer without separating. This first precaution taken, I heated it again; then I submitted the mass to another hammering, and continued to repeat this till after a succession of operations I obtained a bar perfectly cohesive, ductile, and homogeneous, which I hammered into plates, and of which I formed a vase, the high polish of which was a proof of its entire homogeneousness. This process is exactly similar to the one which has been adopted with platinum.

I afterwards tried gold obtained in powder by precipitation from solution in *aqua regia*. The results were exactly the same as with silver.

A similar effect ought to be produced on copper, if I could succeed in preventing the formation of oxide; and I attempted the experiment on the metallic powder produced by the reduction of peroxide by a current of hydrogen gas. Yet I experienced great difficulties, on account of the facility with which films of oxide were formed even while operating under charcoal. The following is the method which has succeeded best:—I put in the tube used for the operation a scarcely cohesive lump, the size of a walnut; I impregnated it with oil, and heated it rapidly till it became red. Then I hammered it with the greatest precaution. I again impregnated it with oil, and continued to do so till at length there remained, after considerable waste, a small bar of ductile red copper, which I could afterwards form into plates in the same manner as gold and silver.

It is evident that oxide of nickel, which is reduced by the least contact with carbonated vapours, and which the flame of the blowpipe instantly changes into metallic powder, even when covered with borax, could be acted on in the same manner as the preceding metals; and that it would also be possible to obtain sheets of this metal, which has hitherto been considered so refractory.

However this may be, my successful attempts on gold and silver suggested the possibility of obtaining a damask from these two metals, which it is impossible to produce by fusion. To effect this I placed in a crucible alternate layers of silver and gold dust, and the operation answered my expectation, in adopting the same process which I had followed with the metals separately; but the imperfect method that I have described is naturally capable of great improvements. It would be possible, for instance, by the aid of the hydraulic press, to form a plate of silver powder sufficiently cohesive to support itself. This plate should be stamped by a punch, and the spaces filled with gold dust, also agglomerated. From this would result a kind of plating, which might be rendered more cohesive by annealing, and afterwards by hammering, till the mass had acquired density and metallic cohesion. It will be conceived that in this preparation it would be very essential to take into account the contractility of the metals, otherwise there would be continual separation of parts, and consequently fractures. Yet there is no occasion to be discouraged by any slight gaps that may be perceptible after the operation is ended, for I have learnt from experience that they disappear on the application of the hammer, and on the approximation of the particles. It would be possible also to obtain characters, devices, marblings, in short, any designs whatever, of gold, inlaid or damasked, in a plate of silver. It would also be possible to put a plate of gold or silver, and by this means immediately manufacture a gilding as thick as required, and more solid than silver gilt on the simple plate.

The damascine would also be capable of being varied by polishing either the gold or silver surface, or by merely deadening the silver by *aqua fortis*, or the gold by rubbing the surface with mercury, which should afterwards be expelled by heat. The workmanship might be still further modified, and colors even produced by annealing the silver surface. This operation has succeeded very well, by covering the surface of a sheet of silver with hydrosulphate of ammonia, and by exposing the whole in a muffle, at the degree of heat just necessary to effect the combination of the sulphur and silver; it must afterwards be withdrawn from the fire, otherwise the unequal dilations of the sulphur and metal would cause it to scale off, which is perceived by the decrepitation of the sulphur. The work sulphurised in this manner is at first tarnished and black; but the ductility of the sulphate of silver, afterwards approximates the particles sufficiently to display its metallic brightness and its blue steel color.

The hammering must not be carried too far, otherwise the parts of gold and silver which are joined, separate, and form an intermediate rim, more or less large, the shade of which is far from desirable. Notwithstanding, by taking the requisite precautions, that property which the two metals possess of being united without fusion may be turned to advantage, for on afterwards dipping the damascine plates into diluted *aqua fortis*, a series of bands, or unpolished marbling, are obtained resulting from the pure silver; then a second series of white veins, or of pale yellow, which, rendered firm by the mixture of gold and silver, remain polished,—and, in short, in the centre there are yellow brilliant bands which are of pure gold.

EXPERIMENTS WITH LOCOMOTIVES ON GRADIENTS.

In Mr. Wishaw's work, on the "Railways of Great Britain and Ireland," we find a detailed account of a series of experiments which the author has made, for the purpose of showing the every-day work performed by different kinds of locomotive engines on level planes, and also on ascending and descending inclined planes, graduated with first, second, and third-class inclinations. The first class of gradients is sixteen feet, or 1 in 330; the second class is fifty-two feet and eighty cents, or 1 in 100; and the third class is eighty-eight feet, or 1 in 60. All inclines with gradients above eighty-eight feet belong to a fourth class. The railways on which the experiments were made are the Arbroath and Forfar, the Birmingham and Derby, the Dundee and Arbroath, the Garnkirk and Glasgow, the Grand Junction, the Great Western, the Leeds and Selby, the Liverpool and Manchester, the London and Birmingham, the London and Croydon, the London and South-Western, the Newcastle and Carlisle, the North Union, the Stockton and Darlington, and the York and North Midland. The general results of these experiments bring to light some curious and important facts, with regard to the laying out and first cost of railways. Mr. Wishaw says:—

"On some of the main lines an enormously increased expenditure has been incurred, for the purpose of obtaining first-class gradients throughout; yet, in the every-day working of railways, we find that as high, and in some instances higher, average rates of speed are maintained throughout each trip on lines having a great proportion of gradients under the first class.

"The London and Birmingham Railway is a forcible example of excessive first cost; occasioned, in a great degree, by excluding second-class gradients; yet in thirty-two practical experiments made on that line, the average speed maintained throughout was equal to only 24.69 miles an hour; whereas on the Grand Junction line, where second-class gradients were introduced for the express purpose of keeping down the original cost, the average speed maintained throughout twenty-four experiments was equal to 26.20 miles an hour.

"On the Newcastle and Carlisle, North Union, and Stockton and Darlington Railways, each of which has second-class gradients, and some of the highest degree, the results as to the first and second are equally favorable, and on the third nearly so.

"On the Newcastle and Carlisle Railway, which, in addition to some second-class gradients, is made up of a series of quick curves almost from end to end, the average speed maintained throughout eleven experiments was equal to 21.41 miles an hour.

"On the North Union Railway, one-fourth of the length of which is graduated with the highest degree (1 in 100) of second class gradients, the average speed throughout was equal to 26.20 miles an hour.

"On tho Stockton and Darlington Railway, which is entirely an ascending line in one direction, and has also a great proportion of second-class gradients, the average speed maintained throughout six experiments was equal to 22.38 miles an hour. This last and less favorable result is partly to be attributed to the fuel being of less calorific value, and partly to the Stockton terminal plane being on an acclivity of 1 in 104 for upwards of a mile in length. Nothing can show a greater want of judgment in laying out a railway to be worked by locomotive engines, than making either of the terminal planes on a steep acclivity; either a level plane, or, better, a declivity of short length, should always be introduced at the terminal stations; and at the intermediate stations a level plane, if possible, but on no account a steep inclination. In the case of the terminal planes, the *declivity* is required for *starting* tho engines, and the *acclivity* for *checking* their velocity on arrival; but at the intermediate stations the case is different, as the engines approach them from either side.

"In comparing velocities on railways differently graduated, we must take the mean velocity of the ascending and descending trains. As, for example: on the London and Birmingham Railway we found the average velocity, in ascending the inclines of 1 in 330, from a variety of trials, to be equal to 28.11 miles an hour; and in descending similar inclines, equal to 32.62 miles an hour: taking the mean of these results, we have an average speed for the maximum of the first class of gradients of 30.36 miles an hour.

"Again: on the Madeley Incline of the Grand Junction Railway, having a second-class inclination of 1 in 177, the average ascending speed (with as many trials as made on the London and Birmingham 16 feet inclines) we found to be equal to 22.65 miles an hour, and the average descending speed to 41 69 miles an hour. The mean of these results is 32.17 miles an hour.

"We shall only further adduce instances of ascending and descending velocities on the maximum of the second-class gradients, or 1 in 100. The best example we can bring forward is that of the North Union Railway, one-fourth of the length of which has inclinations of 1 in 100. We found by several trials that the average ascending velocity was equal to 20.44 miles an hour, and the average descendiug velocity to 34 57 miles an hour. The mean of these results is 27.50 miles an hour. In laying out a railway, however, with second-class gradients, care must be taken not to introduce inclines of the maximum inclinations of greator length than from half to three quarters of a mile; and if a contiuued series of steep inclines is rendered necessary, in order to attain a lofty summit in a short distance, it is very desirable to separate these inclines by level planes, however short, in preference to inclines of any degree.

"In attaining a lofty eminence by steep grades interspersed with short level planes, a locomotive engine may be compared to a horse: the one is thus enabled to recover, as it were, its steam at certain intervals of the ascent, and the other its wind.

"With regard to intermediate stoppages, it will be seen throughout the experiments that much power is absorbed, and time occupied, on every railway, however well managed; and we look forward confidently to the time when each stoppage on 'the way' will be rendered nearly of certain duration, and not exceed a maximum of five minutes in any instance.

ENGLISH EXPIRED PATENTS.

Robert Barlow, of Chelsea, *a new combination of machinery or new motion for superseding the necessity of the ordinary crank in steam-engines, and for other purposes where power is required*, Feb. 1.

John Frederick Daniell, of Gower-street, Esq., *improvements in the manufacture of gas*, Feb. 1.

John Oldham, of Dublin, gent., *improvements in the construction of wheels, designed for driving machinery, which are to be impelled by water, or by wind; and which said improvements are also applicable to propelling boats and other vessels*, Feb. 1.

Ralph Hindmarsh, of Newcastle-upon-Tyne, master mariner, *an improvement in the construction of capstans and windlasses*, Feb. 1.

Robert Stirling, Minister of Galsten, in Ayrshire, aud James Stirling, of Glasgow, engineer, *improvements in air engines for moving of machinery*, Feb. 1.

John White, of Southampton, engineer and iron-founder, *improvements in the construction of pistons or buckets for pumps*, Feb. 1.

Samuel Parker, of Argyle-place, Westminster, bronzist, *improvements in the construction of lamps*, Feb. 1.

Antoine Adolphe Marrellin Marbot, of Norfolk-street, Strand, merchant, *improved machinery for working or cutting wood into all kinds of mouldings, rebates, cornices, or any sort of fluted work*, (communicated by a foreigner), Feb. 3.

Sir William Congreve, of Cecil-street, Strand, Bart., *a new motive power*, Feb. 8.

PATENTS.—BRITISH AND FOREIGN.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 67.)

John Cox, of Ironmonger-lane, civil engineer, for *improvements in the construction of ovens for the manufacture of coke, and other purposes*, Jan. 19.—The oven is constructed of any convenient form, and of suitable materials. The best Stourbridge fire-bricks, with the joints closed by the same clay of which the fire-bricks have been made, is preferred. The roof of the oven is to be made very thin, and a broad flat shallow flue formed over it. The oven is charged in the usual manner, and the door closed, and as the gaseous products arise they are conveyed through proper small apertures into the flue above, where they are supplied with a sufficient quantity of atmospheric air to support combustion. They are consumed in the flue, and the heat transmitted downwards, for the purpose of promoting the process of coking through the roof of the oven. In some cases only part of the distilled products is consumed for the purpose of coking, and the remainder carried away in any convenient manner for any other purpose for which it may be required. In other cases the atmospheric air is admitted into the chamber with the coal, and thereby the products are consumed together with the coal. Sometimes retorts or other small vessels to be heated are set in the flue above the roof of the oven, and the products consumed as at first described.

The inventor does not claim the mode of consuming the distilled products in the same chamber as the coal; nor the application of flues to the bottom, sides, or ends of the oven; but he claims

First—The creation of heat by the admission of atmospheric air to the distilled products in or after they have left the oven, and the consequent combustion of the said products in or after they have left the oven.

Second—The same, whether the air be admitted at the top, bottom, sides, or ends of the oven.

Third—The same, whether the heat be employed for the process of coking only, or for manufacturing or other purposes as well.

Fourth—The promoting the process of coking by the application of a flue or flues over the top of the oven; whatever be the form or construction thereof.

Francis Todd, of Pindinnis Castle, Falmouth, for *improvements in obtaining silver from ores and other matters containing it* (being a communication), Jan. 27.—The inventor first states that it is usual to melt the ore in a reverberatory or other convenient furnace, then to tap the furnace, and run the contents into water, and then again to melt the mass, and apply the necessary quantity of lead thereto; by which means, in consequence of the high temperature of the furnace, much waste of lead is occasioned. The object of his improvements is to obviate this, and are effected as follows; A bath or baths of lead are provided, into which the melted mass is run from the furnace in such a manner that the stream shall be extremely thin or shallow, in order to offer as great a surface to the lead as possible; the furnace is so tapped that about 3 cwt. only is run into the lead bath at one time; the quantity of lead used is about 600 cwt. to 20 cwt. of ore.

Claim.—Mode of obtaining silver from ores and other substances containing it, by treating it in a melted state by running it into a lead bath or baths.

Thomas William Parkin and Elisha Wilde, of Liverpool, for *an improved method of making and working locomotive and other engines*, Jan. 12.—Claim first.—The construction of a sliding valve, being a hollow ring through which the steam is either admitted or exhausted.

A hollow ring is made to work backwards and forwards between two surfaces. The lower one is the outer surface of the cylinder, the upper one is a plate with a long slot in its centre.

Claim second.—The means used for keeping the valve steam-tight.

The plate is let into a square stuffing-box, which must be packed and kept tight by a square ring, pressing upon the packing by means of set screws, which pass through a flange on the steam box, immediately above the ring.

Claim third.—The construction of machinery for moving the valve, and especially the construction for moving the valve so as to work the steam expansively.

Two slots are made in the lower part of the link in which the cross-head works. In these two bell-crank levers are made to work. A roller is fixed to the inside framing of the engine in such a manner as to form the fulcrum of both levers as they are pressed downwards alternately.

Claim fourth.—The construction of the regulator or throttle valve, by which the steam may be admitted to either cylinder, or to both at once.

Claim fifth.—The combination of machinery for causing the steam to enter the cylinder before instead of behind, and to act against the piston.

A handle is placed on one side of the foot plate, and is connected to a bell-cranked lever, which is attached by a link to a tappet rod. The handle is to be secured by a spring guard. When the handle is in a vertical position, the tappet rod will be out of gear. When it inclines forward it will be in gear, for going either forwards or backwards; when it is moved backwards the tappet rod will be lifted on to a stud, on the third lever above the centre of the shaft connected with a link on the other side, which will cause the steam to be admitted in front instead of behind the piston, and put an effectual drag on the driving wheels of the engine.

John Swain Worth, of Manchester, merchant, for *improvements in cutting vegetable substances* (communicated by a foreigner residing abroad), Jan. 29.—Claim.—The combination of parts for cutting vegetable substances; but the patentee does not claim any of the parts separately, as they may be varied, provided the mode of cutting is retained.

The hay, straw, &c., is cut by passing between two rollers; the bottom one, which is called the surface roller, is composed of cast iron, covered with zinc, block tin, wood, or any soft substance, or if

may be composed wholly of wood; the other, which is called the cutting roller, is provided with grooves on its circumference, into which the knives are received; the distances of the knives from each other being regulated by the required size into which the substances are to be cut. A rapid rotary motion is communicated to the cutting roller, and a slower rotary motion to the surface roller, and the hay and straw being passed between them, are cut into pieces of the size required. The advantages to be obtained by these improvements are:—that the vegetable substances being passed over a solid substance, and a rotary motion communicated to the cutting roller, the laborer is enabled to cut a much larger quantity with less labor.

ROBERT URWIN, of South Shields, in the county of Durham, engineer, for *improvements in steam engines*, Jan. 29.—Claim.—The method or system of working steam, herein described.

These improvements consist in causing each volume of steam, introduced from the boiler into the working cylinder, to produce both the up and down stroke of the piston or pistons, whereby a saving of one half of the steam is effected.

The cylinder is provided with two steam ways, as usual, except that the top of the bottom-way is the height of the piston and three fourths its own height from the bottom of the cylinder, and this bottom-way communicates with an expanding receiver. There is also a groove cut in the cylinder just below the bottom steam-way, by means of which a small quantity of steam is introduced below the piston, when the same has finished its downward stroke, in order to commence the upward stroke.

The steam, on being admitted into the cylinder through the upper way, is allowed to flow unrestrictedly until the piston reaches the bottom-way, when the steam is cut off by closing the upper-way, then the lower-way being open, the steam rushes from the upper side of the piston through the bottom-way into the receiver, and a small portion of the steam at the same time rushing through the groove before mentioned into the small space beneath the piston, commences the upward stroke. As soon as the piston has passed the lower-way the steam from the receiver is admitted into the cylinder beneath it, and by the expansive force of the steam the upward stroke is completed; the steam which remained above the piston being let out into the condenser or the atmosphere. When the piston reaches the top of the cylinder the steam is admitted through the upper-way, as before, and the waste steam below the piston is let into the condenser.

The expanding receiver is provided with a cock which leads from the steam pipe, so that if on the starting of the engine the piston should be at the bottom of the cylinder, a quantity of steam may be admitted into the receiver through the cock, and this steam finding its way through the groove into the space below the piston will commence the upward stroke. The said receiver must be one half larger than the cylinder, and in cases where room is not an object it may be made three times the size of the cylinder with advantage.

In place of the groove, which lets in the steam to commence the upward stroke, an opening of the same size may be cut in the piston, and opened and shut by a valve, which may be worked by the same means as the slides that open and shut the steam-ways.

JOHN LOUIS BACHELARD, of St. Martin's-lane, in the county of Middlesex, gentleman, for *improvements in the manufacture of beds, mattrasses, chairs, sofas, cushions, pads, and other articles of a similar nature* (communicated by a foreigner, residing abroad), July 30.—The patentee does not claim the use of cork generally for stuffing articles, but only when cut into fibres, as here described, and applied to the manufacture of beds, &c.

This invention consists of a mode of stuffing beds, mattrasses, chairs, sofas, cushions, pads, and other articles of a like nature, by cork, cut into a fine or a coarse sawdust, or into fibres, of the length of from half an inch to two inches or more, and the thirteenth of an inch thick, by the eighth to the twentieth of an inch wide.

The workman, in using the material, proceeds in the same manner as when stuffing with horse-hair or wool, and the patentee states, that a mixture of horse-hair or wool with the cork is found best to carry out this invention. The fine cork forms a substratum, and being covered with a slight covering of horse-hair or wool, will give the smoothness of a mattrass, stuffed with horse-hair or wool, with the elasticity of cork, and the advantage of a cheaper material.

GEORGE BLAXLAND, of Greenwich, Kent, engineer, for *an improved mode of propelling ships and vessels at sea, and in navigable waters*, Jan. 28.—One or more inclined planes or propellers are affixed at right angles to a revolving horizontal shaft, placed over the after-part of the keel just before the rudder post, and turned by gearing from the engine. The inclined planes work below water line, in an opening formed in the dead wood of the vessel, and have no bearings or journals beyond the inclines, so as not to be connected in any way with the rudder post. Their being placed at right angles with the course of the vessel enables them to work in the water with the least degree of friction.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page* 68.)

JOSEPH BENNETT, of Turnlee, near Glossop, in the county of Derby, cotton-spinner and paper-maker, for *certain improvements in machinery for cutting rags, ropes, waste hay, straw, or other soft or fibrous substances, usually subject to the operation of cutting or chopping, part of which improvements are applicable to the tearing, pulling in pieces, or opening of rags, ropes, or other tough materials.* Jan. 29.—Claim first.—The application of the combination of machinery, or apparatus, herein described, for the purpose of cutting rags, ropes, &c.

The rags, ropes, &c., to be cut, are brought into contact with a fixed knife, by a fluted roller, called a feeding roller; and the cut is effected by two or more revolving knives, attached to the side of a wheel, and which knives, coming in contact with the fixed knife, cut up the rags, which, as they are cut, are carried away by a continuous discharging cloth passing over two rollers.

Claim second.—The application of the combination of machinery, or apparatus, herein described, for pulling to pieces, tearing, and opening rags, and other tough fibrous substances.

The rags to be torn or pulled to pieces are brought by a feeding roller, as before mentioned, into contact with sharp steel teeth, which fill the inside of a cylinder. These teeth, being constantly revolving, tear the rags to pieces, and the rags so torn pass over gratings to separate the dust from them as they proceed to the dust cylinder and discharging feeder. The dust is removed from the dust cylinder through suitable pipes by a fan, which is put in motion by an endless band from the shaft of the tearing cylinder.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page* 68.)

ALEXANDER ANGUS CROLL, superintendent of the works of the Gas-light and Coke Company, in Brick-lane, Middlesex, for *certain improvements in the manufacture of gas for the purpose of illumination, and for the preparation or manufacture of materials to be used in the purification of gas for the purpose of illumination*, Jan. 29.—The patentee claims the purification of coal gas from ammonia, by means of the chloride and sulphate of manganese and muriate of iron, and sulphuric and muriatic acid; and the purification of coal gas from sulphuretted hydrogen, by the oxide of manganese. The oxide of iron and the oxide of zinc, as applied in the particular manner and stage of the manufacture of gas before mentioned, and not otherwise; also the manufacturing or reproducing of all the salts by double decomposition.

This invention consists, First,—In purifying coal gas from ammonia, by the use of salts, acids, and oxides, as herein described.

Secondly,—In the re-formation or re-production of all the salts, by double decomposition with common salt.

The mode of purifying coal gas from ammonia is as follows:—A vessel, now used in the manufacture of gas for holding wet lime for the purifying of the gas, is filled with a solution composed of one hundred weight of chloride of manganese to forty gallons of water, and the gas is forced through this solution in the usual way, by the pressure from the retorts, by which means the ammonia is abstracted from the gas, and likewise a portion of the sulphuretted hydrogen; but a further purification of the gas is necessary to abstract all the sulphuretted hydrogen, which may be done by the means herein-after mentioned, or by the ordinary method. As soon as this solution is saturated with ammonia, (which may be ascertained by testing it with a piece of litmus paper, reddened by an acid, or any of the well-known tests,) it is drawn off and the vessel fresh charged.

Sulphuric and muriatic acids may be used for the same purpose, as follows:—If sulphuric acid, a vessel, now commonly used for washing gas, is filled with a solution composed of one hundred gallons of water to two pounds and a half of sulphuric acid, of the specific gravity of 1·845, and the gas is passed through it as usual until it has attained the specific gravity of 1·170, and is saturated with ammonia; which may be proved by testing it by the means before mentioned. It is then drawn off.

Muriatic acid may be used in the same manner as to proportion, being of the specific gravity of 1·165 before it is mixed with the water, and it is to be drawn off on attaining the specific gravity of 1·170, the same as sulphuric acid; but the patentee prefers sulphuric to muriatic acid. Sulphate of manganese and muriate of iron may likewise be used for the above purposes.

To obtain the ammoniacal salts (where a salt has been used for purification), let the insoluble part of the solution settle, and draw off the clear liquor, which is composed of muriate of ammonia and sulphate of sodium. These must be separated from each other, either by crystallising the ammonia from the salts of sodium, or by evaporating both to dryness, and subliming the ammonia from the salts of sodium. If an acid is used, it is only necessary to evaporate the ammonia. The salts formed by the use of the chloride of manganese and salts of zinc may be reproduced by the same means.

The third part of these improvements is the application of the black oxide of manganese to the freeing of coal gas from sulphuretted hydrogen.

A vessel, similar to those now in use for purifying gas, by what is termed dry lime, is charged in the same manner with black oxide of manganese in powder, moistened with water to the same consistence, and the gas is passed through it in the same manner as with dry lime. As soon as this material has become completely saturated with sulphuretted hydrogen, it is removed, and roasted in an oven (to expel all the sulphur from it) until it is soft and spongy, care being taken to keep it well stirred while in the oven. It is now ready to be employed again by putting it into the purifier, and moistening it with water, as before.

The peculiar mode of manufacturing or reproducing the salts, by double decomposition of salt, and the residuum and precipitates of chloride of manganese, is as follows:—To twelve ounces of the dry precipitate, add one pound of common salt, mix them intimately together, and submit them, in a suitable furnace, to a heat scarcely perceptible in the dark, for two or three hours; then to one hundred and forty pounds of this mixture add forty gallons of water. It is then fit to be used for purifying gas from ammonia; and the residuum, which the gas leaves in passing through it, is to be treated in like manner. The insoluble part of the solution before mentioned may be brought to its original state by dissolving it in the acid forming one of its bases, or dissolving it in sulphuric or muriatic acid, if a sulphate or muriate of ammonia is required for any operation.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 10th of April.

Frederick Payne Mackekan, of Birmingham, due April 1.

Thomas Joyce, of Manchester, ironmonger, due April 1.

William Henry Fox Talbot, of Lacock Abbey, Wilts, Esq., due April 1.

William Horsfall, of Manchester, card-maker, due April 1.

James Stirling, of Dundee, engineer, and Robert Stirling, of Glaston, Aryshire, Doctor in Divinity, due April 1.

George Ritchie, of Gracechurch-street, and Edward Bowra, of the same place, manufacturers, due April 1.

James Fitt, senior, of Wilmer Gardens, Hoxton-old-town, manufacturer, due April 7.

John Davies, of Manchester, civil engineer, due April 7.

Thomas Spencer, of Liverpool, carver and gilder, and John Wilson, of the same place, lecturer on chemistry, due April 7.

Thomas Wood, the younger, of Wandsworth-road, Clapham, gent., due April 7.

FOREIGN PATENTS.—BELGIUM.

LIST OF PATENTS RECENTLY GRANTED BY THE BELGIAN GOVERNMENT.

(*Continued from page* 325, *Vol. III.*)

A. M. Timbrell, of Bonsecours, Hainault, a patent of invention and improvement for 10 years, for *an improved method of propelling carriages and vessels without the aid of steam*, Nov. 12, 1840.

Louis Seresia, a patent of invention for 5 years, for *an economical heating apparatus*, Nov. 13, 1840.

A. Jones, a patent of invention for 5 years, for *a new kind of musket to be loaded at the breech*, Nov. 13, 1840.

J. M. Reymer, a patent of invention for 15 years, for *an improved spherical castor for furniture and other objects*, Nov. 13, 1840.

Marie Ursule Bosselin, a patent of invention for 5 years, for *a continuous fecula sieve*, Nov. 13, 1840.

G. R. and H. Elkington, a patent of invention for 10 years, for *improvements in plating and tinning certain metals*, Nov. 13, 1840.

W. H. Taylor, a patent of invention for 10 years, for *improvements in the mode of making staves, laths, shingles, &c.*, Nov. 13, 1840.

R. White, a patent of improvement for 15 years, to date from the 18th Feb. 1840, for *additions to the improved economical stove*, (*for which he obtained a patent the* 18*th Feb.* 1840,) Nov. 31, 1840.

D. E. Coutaret and D. A. Roumestant, a patent of invention for 15 years, for *the composition of an animo-vegetable grease for railway carriages, engines*, &c., Nov. 13, 1840.

J. B. Tireher, a patent of importation for 5 years, for *improvements in time-pieces and clocks*, Nov. 13, 1840.

Jean Aubagnac, a patent of invention for 15 years, for *a new plan of priming percussion fire-arms, with common caps in cocking, without the aid of the hand*, Nov. 13, 1840.

Joseph Ricard, a patent of invention for 10 years, for *the manufacture of a lacing, called by the inventor "Belgian gold twist,"* Nov. 20, 1840.

W. H. Ritchie, a patent of importation for 5 years, for *improvements in printing calicoes and stuffs*, Nov. 20, 1840.

E. S. De Rottermund, a patent of invention for 10 years, for *an apparatus for preventing chimneys from smoking*, Nov. 23, 1840.

F. C. Montigny, a patent of invention for 15 years, for *a ventilator for mines, foundries, forges, &c.*, Nov. 23, 1840.

Thomas Holme Bower, a patent of importation and improvement for 5 years, for *an improved lock and key*, Nov. 23, 1840.

Alonzo Grandison Hull, a patent of importation and improvement for 5 years, for *an apparatus for making screws*, Nov. 23, 1840.

Robert Hampson, a patent of importation for 10 years, for *an improved machine for printing cotton and other fabrics*, Nov. 27, 1840.

V. P. Delamore, a patent of invention for 5 years, for *a new blacking*, Nov. 28, 1840.

G. De Ridder, a patent of improvement for 15 years, for *a new locomotive engine for railroads*, Nov. 28, 1840.

A. Le Hardy de Beaulieu, a patent of invention for 15 years, for *a machine for manufacturing nails from cast iron*, Nov. 28, 1840.

W. Newton, a patent of importation for 5 years, for *improvements in the means of obtaining motive power*, Nov, 28, 1840.

R. W. Urling, a patent of importation for 5 years, for *improvements in paper-making machines, called "machines Oechelhauessen,"* Nov, 28, 1840.

F. T. Barthelemy, a patent of importation for 5 years, for *a "reproduction hydraulique,"* Nov. 28, 1840.

A. Dixon, a patent of importation for 5 years, for *an improved process of joining iron tubes or pipes*, Nov. 28, 1840.

W. H. Ritchie, a patent of importation and addition for 5 years, to date from 20th November 1840, for *improvements in printing calicoes and other stuffs*, Nov. 28, 1840.

T. B. H. Mouzon, a patent of improvement for 10 years, to date from 10th October 1839, for *improvements in heating apparatus in which steam is substituted for water*, Nov. 28, 1840.

Dierickx de Courchelle, address at Brussels, Longue rue Neuve, No. 22, a patent of invention for 15 years, for *an economical heating apparatus*, Nov. 30, 1840.

J. W. Watson, of London, represented by Dixon, of Brussels, hotel le Groenendael, a patent of importation for 5 years, for *improvements in the treating of farinaceous substances for obtaining therefrom starch and other products, as likewise in the manufacture of starch*, Dec. 7, 1840.

Jh. Howland Bill, of London, represented by Prisse, of Ixelles, rue du Berger, No. 79, a patent of importation and improvement for 5 years, for *improvements in machines or apparatus for making pins and putting them in paper*, Dec. 7, 1840.

A. L. Domine, represented by Lacambre and Persae, a patent of invention for 10 years, for *a new means of preventing escapes in the joints of locomotive pipes*, Dec. 14, 1840.

James Walton, of London, represented by Dixon, a patent of invention for 10 years, for *improvements in making beds, mattrasses, bolsters, &c. &c., likewise for packing materials*, Dec. 14, 1840.

C. H. Crespin, a patent of invention for 10 years, for *a process of making matrices for printing on the covers of books*, Dec. 14, 1840.

W. E. Newton, of London, a patent of importation for 5 years, for *improvements in machines or apparatus for sawing, rasping, or pulverizing dye-woods or bark*, Dec. 14, 1840.

C. Craeg and H. R. Rowland, a patent of improvement and importation for 5 years, for *a new apparatus for washing rags and other fibrous substances used in making paper*, Dec. 14, 1840.

W. Newton, patent of improvement and importation for 5 years, for *improvements in wheels for railway and common roads*, Dec. 14, 1840.

P. Bradshaw, of London, represented by Dixon, of Brussels, hotel de Groenendael, a patent of invention for 10 years, for *improvements in the mode of sowing corn and other seeds*, Dec. 16, 1840.

J. J. X. Verplanke, of Ghent, a patent of invention for 10 years, for *an improvement in putting in motion continuous machinery for spinning flax and tow*, Dec. 16, 1840.

Ch. Keene, represented by Loundoun, a patent of invention for 10 years, for *a process of waterproofing leather and manufactured stuffs*, Dec. 22, 1840.

Lacambre and Persae, of Brussels, rue Royale, No. 53, a patent of invention for 10 years, for *a new machine for raising the nap of cloth*, Dec. 22, 1840.

C. S. Tiry, F. J. Daubresse, and A. A. Fages, a patent of invention for 10 years, for *ovens for making coke from any description of coal, and for heating steam-engine boilers*, Dec. 22, 1840.

Ad. D. Duchesne, of Paris, a patent of invention for 15 years, for *apparatus for effecting a saving of fuel in common fire-places, and for preventing chimneys from smoking*, Dec. 22, 1840.

Jean François Dugnialle, of Brussels, place du Petit Sablon, No. 21, a patent of invention for 10 years, for *a carriage adapted to railroads and common roads*, Dec. 22, 1840.

A. Saint, of Paris, address at Brussels, rue de l'Ecuyer, a patent of importation and addition for 5 years, to date from the 21st July, 1840, for *an addition to the kind of percussion fire-arms* (*for which he obtained a patent the* 21*st July* 1840), Dec. 22, 1840.

Moses Poole, of London, represented by Dixon, of Brussels, hotel de Groenendael, a patent of importation, for *improvements in steam engines, the said improvements being equally applicable to engines for raising and depressing liquids*, Dec. 22, 1840.

Phœnix Company, of Ghent, a patent of importation for 5 years, for *a complete set of machinery for manufacturing cloth, carpets, &c., by means of felting*, Dec. 1, 1840.

A. J. Borlée, a patent of improvement for 15 years, to date from the 23d Sept., 1840, for *improvements in flour mills*, (*for which he obtained a patent the 23d Sept.* 1840), Dec. 24, 1840.

J. J. Herman, a patent of improvement for 10 years, to date from the 7th Aug., 1839, for *improvements on the new pistol*, (*for which he obtained a patent the 7th Aug.* 1839), Dec. 24, 1840.

M. J. Heger and F. Scheldknecht, a patent of importation for 5 years, for *a process of printing called "à la Congrève,"* Dec. 24, 1840.

J. J. Delhaye, a patent of invention for 10 years, for *an organ producing four different shades of tones*, 28, 1840.

F. Prisse, represented by Lacambre and Persae, a patent of invention for 10 years, for *processes for causing grain to shoot, and to produce malt, for the purpose of making therefrom beer, brandy, &c.*, Dec. 28, 1840.

W. H. Ritchie, represented by Dixon, a patent of importation for 5 years, for *improvements in the mode of obtaining zinc*, Dec. 28, 1840.

Moses Poole, represented by Dixon, a patent of importation for 5 years, for *improvements in salting animal matters*, Dec. 28, 1840.

H. E. Lousbergs-Thery, a patent of importation for 5 years, for *machinery for preparing combed wool and other fibrous substances*, Dec. 28, 1840.

Phœnix Company, a patent of importation for 5 years, for *a mechanical loom for weaving, by means of several shuttles, wool, cotton, flax, silk, and other fibrous substances*, Dec. 28, 1840.

Othon François Joseph Laude, a patent of in-

vention for 10 years, for *a new method of teaching and learning to write*, Dec. 30, 1840.

Etienne Mariotte, a patent of invention for 15 years, for *an apparatus for making coke, for obtaining illuminating gas, and steam for driving an engine*, Dec. 30, 1840.

P. C. Montigny, represented by Sadin, a patent of invention for 15 years, for *an improved moveable friction breech, applicable to percussion or other fire-arms, likewise for new priming*, Dec. 30, 1840.

Theodore Lemielle, a patent of improvement for 15 years, to date from the 15th July 1840, for *new improvements in the miner's lamp, (for which he obtained a patent the 15th July* 1840), Dec. 30, 1840.

D. J. Sauvage, represented by Stoclet, a patent of invention for 10 years, for *a new locomotive for facilitating the passage of wagons over inclined planes, curves, &c.*, Dec. 31, 1840.

David Traets, a patent of invention for 15 years, for *machinery for producing perpetual motion by the pressure of liquids, and which is applicable to machines requiring great power and speed*, Dec. 31, 1840.

H. J. Petry-Verday, a patent of invention for 10 years, for *a new method of making and mending feather beds, woollen mattrasses, &c.*, Dec. 31, 1840.

A. J. Livemont Degardin, a patent of invention for 10 years, for *a machine for cutting wicks for candles, "à la baguette,"* Dec. 31, 1840.

J. L. Polis, a patent of invention for 5 years, for *a circular pressure machine for the purpose of drying cloth and woollen stuffs*, Dec. 31, 1840.

William F. Bursill, a patent of improvement for 5 years, for *means of determining the weight and pressure of solids, fluids, and gases, and for improvements in the construction of balances, barometers, and other weighing machines*, Dec. 31, 1840.

Alexandre de Gandt-Vanderxhueren, a patent of importation for 5 years, for *a simplified continuous spinning-frame, for spinning fibrous substances, such as flax, combed wool, cotton, silk, &c.*, Dec. 31, 1840.

J. Stuttmann, a patent of improvement for 15 years, to date from the 6th June, 1840, for *improvements in the manufacture of wire rope, (for which he obtained a patent the 6th June* 1840), Dec. 31, 1840.

Nathaniel Defries, a patent of invention for 10 years, for *an improved gas meter*, Dec. 31, 1840.

Charles Flude and Joseph Bridge, a patent of invention for 10 years, for *improvements in the construction of furnaces, applicable to metallurgic operations*, Dec. 31, 1840.

Jean Mathieu and Co., a patent of invention for 10 years, for *a machine for making lead, pewter, and copper pipes*, Dec. 31, 1840.

J. W. Newton, a patent of importation and improvement for 5 years, for *improvements in weaving looms*, Dec. 31, 1840.

W. E. Newton, a patent of importation for 5 years, for *improvements in wheels for railroads*, Dec. 31, 1840.

E. L. Le Mercier, a patent of invention for 10 years, for *a new improved lithographic press*, Dec. 31, 1840.

Planque Bury, a patent of invention for 5 years, for *a strap brace*, Dec. 31, 1840.

D. J. M. Magny, a patent of invention for 15 years' for *means of preventing explosions in coal mines*, Dec' 31, 1840.

Jean Charles Huart, a patent of importation for 5 years, for *a chemical process for preserving metals from oxydation and corrosion, and which is likewise applicable to other purposes*, Dec. 31, 1840.

A royal decree, dated Jan. 8, 1840, grants the sum of 634 frs. 92c. to P. Kopezynski, as an encouragement for the patent he obtained the 30th Sept. 1839, for *improvements in Swedish stoves and caloriferes.*

RECENT AMERICAN PATENTS.

[Selections from Dr. Jones's List in the Journal of the Franklin Institute, for October 1840.]

Metallic Covering for the Roofs of Houses; *Peter Naylor, Sept.* 11.—Bars of metal are to be attached to the rafters, and these bars are to be so bent as to form a succession of arches, or elevated ridges, to which metallic plates are to be riveted, in a particular manner. Thin bars of metal, placed edgewise, are to extend along these ridges, and the plates of metal used must be of sufficient width to extend from one of these thin strips to another, and so as to lap over, and to be riveted through them.

The claim is to "the plan of constructing a metallic covering for roofs, and the manner of connecting the edges of the respective sheets together by lapping them upon and riveting them through the bars of metal, whether placed upon arch pieces as first described, or directly upon the timbers, sheeting, or planking, or raised therefrom by battens, or strips of wood, or in any other way, whilst the construction and use remain substantially the same with those herein made known."

Locks for Banks, &c.; *William Stillman, Sept.* 14.—This lock is so constructed as that the continued action of two keys is required to shoot the bolt back and forth, there being, of course, two keyholes. The keys act upon opposite sides of the bolt. There are, also, to be what the patentee calls stoppers, within the lock, the nature and object of which we shall not take the time to describe, as it would require more space than we think proper to devote to it.

Apparatus for Making known any Deficiency of Water in a Steam Boiler; *William H. Hale, Sept.* 14.—This invention is intended for the purpose of sounding an alarm by the escape of steam through a tube, when there is any dangerous deficiency in the quantity of water in a boiler. Said tube leads into a metallic box, containing fusible metal so arranged as that when the metal melts the steam in the boiler can escape through an alarm tube. The particular arrangement made for this purpose forms the subject matter of the claim.

A Machine for Setting Elliptic Springs; *George J. Neveil, Sept.* 20.—This machine is for setting the plates of elliptic springs to the proper curvature; this setting is effected upon a bed of cast or of wrought iron, the upper surface of which has the ordinary curvature to be given to the spring, but for the purpose of increasing the curvature the bed is divided into two parts by a cross section at its middle, and by raising this part, whilst the ends are kept down, the set of the spring will be increased. The setting is effected by means of two rollers, which are attached to arms of the proper length, and working on joints below the bed, which arms may be raised or lowered when required. The steel to be bent is heated, laid upon the bed, and held down, when the rollers are to be passed over its surface.

The claim is to "the combination of the two beds, or forms, regulated as described, with the rollers attached to the levers, and governed by a lever and springs, for the purpose and in the manner set forth."

Improvements in the Machine for Manufacturing Paper; *William Knight, Abijah L. Knight, and Edward F. Condit, Sept.* 25.—"In this machine the paper is formed upon a revolving cylinder, the construction of which is similar to that of the cylinder now in use, but it is made considerably larger in diameter than those generally employed, and the paper stuff, or pulp, is applied to it in a manner different from that used in the other cylinder machines." The pulp is supplied from a pulp-box, above the cylinder, and is fed to it through a gate, properly regulated. It is led off from the first cylinder, and passed between pressing rollers; and from these conducted around and between a succession of drying cylinders, usually ten in number, placed in pairs one above the other, so as to operate as pressing as well as drying cylinders. There are many points of arrangement which we pass over, and furnish the claims made, which are as follow:—

"We claim the combination of the revolving bands with the cylinder for giving an even edge to the paper at each end of the cylinder, causing, by said arrangement, the said band to revolve by the cylinder itself.

"We claim the running of the paper cylinder upon an independent frame, resting upon rollers on a stationary frame, in such manner as to admit of a vibratory motion being communicated to said upper frame, and the parts appended thereto, as described.

"We claim the combining of the naked wooden roller with the roller for the purpose of collecting the broken paper, or pulp, as set forth.

"We claim the arrangement of the drying cylinders in a number of successive pairs, for the purpose of simultaneously drying and pressing the paper, as described."

A Steam Boiler; *Richard V. De Witt, Sept.* 25.—"Claim. I do not claim, as my invention, the placing of a furnace, or of flues, within a boiler, nor do I claim the giving to the flues a scroll like or spiral form, this having been done in the labyrinth boiler; but I limit my claim to the continuous diminution of the capacity of such a flue, for the purpose and in the manner set forth, however the furnace may be situated, and whether the combustion be kept up by the ordinary draught, or urged by a fan wheel, or other blowing apparatus.

The boiler upon which this is an improvement was patented by Mr. Van Order, of Ithaca, New York; his flue was scroll-formed, but its section was the same throughout, the sides of the scroll having been parallel to each other. Mr. De Witt says, "but instead of keeping the sides thereof parallel longitudinally, I cause them to approach each other from the point at which the flue leaves the furnace until it terminates in the chimney, so that the space for the gaseous products of combustion undergoes a regular diminution. The object of this gradual contraction of the flue is to compress these products, as the gases contract by their loss of heat, by which contraction said gases are more effectually brought into contact with the walls of the flue than in the labyrinth boiler."

Squaring and Finishing the Heads of Bolts, Nuts, &c.; *John Bellemere, Sept.* 25.—A chuck for a lathe is so constructed as that a number of screw bolts and nuts may be fixed in it, in such a manner as that by means of a slide rest one side of each bolt, or nut, may be turned and finished. The mode of doing this, when once the idea is conveyed, will readily occur to any handy workman.

Improvement in the Construction of Lime Kilns; *A. H. Tyson, Sept.* 28.—"Claim. What I claim as my invention is the introduction of a vertical pipe in the centre of the kiln, for increasing the draught. Also, the introduction of water to prevent the vitrification of the lime, by means of pipes, arranged as set forth. The constructing of the centre grate of the form described, so as to permit the ashes and refuse lime to slide down its sides, and pass between the grat-ebars into the ash-pit below. Also, the employment of the inclined doors for the discharging the lime."

The vertical pipe is suspended in the centre of the kiln, and is perforated with numerous holes at its sides, so that air passing into its open upper end may be diffused through the lime. This tube, as represented, rises to a small distance only above the kiln, and must therefore be in an atmosphere of carbonic acid, which would aid but little in promoting combustion.

Through the sides of the kiln there are a number of tubes inserted, which are furnished with stoppers, and through these tubes water is occasionally to be poured, which, it is said, will reduce any vitrified lime to powder, and cause it to fall down, and pass through the grate into the ash-pit.

Improvement in Force Pumps; *Thomas W. H. Mosely, Sept.* 30.—In this pump, when placed in a

well, the chamber and valves are to be entirely under water; and there are two rods which extend down from the brake, and are attached to the opposite ends of a vibrating lever with equal arms, to one end of which lever the piston-rod is also attached. The two rods are jointed to the brake at equal distance from its fulcra. By this arrangement, the rods extending down from the brake operate upon the lower lever by tension, and may therefore be small. There is also a device for letting the water out of the ascending main, to prevent its freezing. The claim is to "the manner in which the rods, operating by tension, are combined and arranged with the lever, the brake, and the piston-rod, so as to actuate a force-pump, situated entirely below the surface of the water in a well or other reservoir; the parts being so arranged in other respects, in the manner set forth, as effectually to prevent the freezing of the water."

Preventing Steam Boiler Explosions; *Isaac N. Coffin, Sept.* 30.—"The nature of my invention consists in the so adapting a float within the boiler to a valve, escape tube, rotary engine, and pumps, as that by the lowering of the water in the boiler, and the consequent depression of the float, a portion of the steam shall escape, and in so doing shall give motion to the rotary engine, and through this to a pump or pumps, for supplying the boiler with water." The claim is to this arrangement.

PATENT LAW CASES.

Opposition to a Patent.—In the Court of Chancery on Saturday the case of Coates's claim for a patent for making rails was decided. Mr. Wigram and Mr. K. Parker stated, that when this patent was about to pass the great seal it had been referred back to the Attorney-General to determine whether the specification excluded a machine, the invention of which was disputed in a suit "Soley v. Coates." The answer had been in favor of Mr. Coates, and it was expedient that it should be passed before the 8th of February. W. Sharpe, for the solicitors of Mr. Soley, who had opposed the passing of the patent, said, the alleged invention was founded on a machine made in America for the improved manufacture of nails and spikes. They opposed the sealing of the patent, because the invention was that of a brother of Mr. Soley, in America. The Lord Chancellor said, the object seemed to be to exclude the patent by lapse of time, as no effort had been made, either before the Attorney-General or himself, to show the similarity of the machines. The Attorney-General had certified, that Mr. Coates's patent did not interfere with the original machines, and it must pass the great seal. The costs of the present application must be paid by the solicitors who had lodged the caveat.

Infringement of a Patent.—In the Vice-Chancellor's Court on Saturday, the case of Macnamara v. Camac and others, for alleged infringement of a patent for wood paving, came on for hearing. The motion was made on behalf of Mr. Macnamara, the patentee of an invention for the pavement of carriage-roads by a peculiar method of laying blocks of stone or other material, cut in a particular form, for an injunction to restrain the defendants, who represented the Metropolitan Wood Paving Company, from proceeding to employ for similar purposes certain blocks of wood placed reversely at a certain angle, and pegged together by a dowel, so as to form an infringement in the principle of the plaintiff's invention. The plaintiff obtained his patent in March, 1837, and in June, 1839, a solicitor, named Hodgson, also obtained a patent for blocks of wood shaped according to Count de Lisle's stereotomy of the cube, which had since been purchased by the defendants. The plaintiff alleged that this method of dissecting the cube, and placing the blocks of stone or wood sloping at certain angles against each other, was previously described in the specification of his invention, the only difference being, that instead of one block having each end bevelled or cut at an angle, both inwards and outwards, as the plaintiff described it in his specification, Mr. Hodgson proposed to make use of two blocks, placed with their bases reversed to each other, and united by dowels or pegs, so as to form together one block, in all respects the same as the plaintiff's. The plaintiff first discovered the infringement on the 16th December, 1839, when the defendants' blocks were applied to the pavement of the road at Whitehall. He then made a written complaint of the infringement, and had also given subsequent remonstrances, but had not taken any legal step to defend his invention until the institution of the present suit. The Vice-Chancellor, without hearing the counsel in opposition, said, he doubted very much whether there had been any infringement of the plaintiff's patent. With regard to the invention itself, any one who had walked through St. James's Park and seen the *cheveux de frise* placed about a certain great cannon had been made acquainted with the whole principle of the thing. There was, nevertheless, a great difference between the two inventions, which his honor proceeded to point out. It appeared that the plaintiff discovered what he considered an infringement of his patent as long ago as December, 1839, and, though the notification he then made to the defendants did not have the effect of stopping their proceedings, he did not take any step at law to defend his pateut, but suffered the defendants to go on exercising their patent to a very considerable extent, and now asked the court to retain his bill, and grant an injunction, until the question could be tried at law. This his honor thought would be acting unfairly towards the defendants, and, therefore, he refused the injunction with costs.

RAILWAY INTELLIGENCE, DOMESTIC AND FOREIGN.

Proposed London and Manchester Railway.—A meeting of gentlemen, desirous of promoting the formation of a railway from London to Manchester direct, through the Churnet Valley, was held at the Royal Oak Inn, Cheadle, on the 21st ult.—Mr. J. M. Blagg (the company's agent for the Cheadle district), entered into a detail of particulars respecting the proposed railway from London to Manchester by way of Leicester, which, it was expected, would shorten the distance about thirty miles. It was calculated that 5,500,000*l*. would cover every expense of obtaining the act, purchasing the land, forming the railway, erecting stations, and providing locomotive power; but, not to be within the mark, the capital of the company was fixed at 6,000,000*l*. The company was not yet formed, and the object in bringing the business forward now was to enable the projectors to complete their plans and books of reference, so as to bring them before Parliament in March next. To effect this, they require the sum of 3,000*l*., to pay the expenses of surveyors, &c., which they hoped to raise by the contributions of those who were friendly to the undertaking; 200*l*. had been subscribed for the object at Luton and Derby, and it was proposed shortly to call meetings, for the purpose of raising the funds requisite, at Leicester. Mr. Cattlow (who attended on behalf of the Midland Counties Company) said, he was authorised to inform the meeting that the real Churnet Valley line was not abandoned; it extended from Derby to Macclesfield, a distance of forty-two miles—could be constructed for a capital of about one million—was not likely to provoke opposition—and would connect Manchester, Stockport, and Macclesfield, with Derby, Nottingham, Leicester, and the Eastern Counties. Mr. Cattlow concluded by moving the following resolution:—"That this meeting learns, with great satisfaction, the intention of the Midland Counties Railway Company to persevere in making a railway from Derby to Macclesfield, through the Churnet Valley; and is of opinion that the Midland Counties Railway Company is entitled to the confidence and undivided support of the neighborhood." This motion, after some opposition, was carried by a large majority.

Proposed Doncaster and North Midland Railway.—A railway between Doncaster and Swinton, on the line of the North Midland Railway, is proposed. The advantages to the public from forming this line seem various and considerable; and from the comparative cheapness of working, it is likely to be profitable, unless the expenses of a preliminary nature be needlessly swollen by opposition in Parliament. Messrs. Robert Stephenson and F. Swanwick are appointed engineers to the new company. The project is cordially supported by the directors of the North Midland and Sheffield and Rotherham railways.

Grand Junction Railway.—A general meeting of proprietors of the Grand Junction Railway was held on Friday afternoon, at one o'clock, in Liverpool. From the report, it appeared that in the receipt from every branch of income there is an increase, as compared with the corresponding part of 1839, except in the carriage of live stock, which is rather less, while the ratio of expenditure to receipt is again considerably lower. The receipts were:—

	Last six months of 1840.				Last six months of 1839.		
From Coaching	£188,620	15	5	..	187,476	8	5
" Goods...	40,934	2	1	..	35,220	10	0
" Live stock	3,008	10	11	..	3,607	5	8
	232,563	8	5	..	226,304	4	1
Expenses..	99,627	1	7	..	107,880	10	5

This saving, it was stated, is principally in the important item of locomotive power, the comparative outlay being, for the last six months of 1839, on a receipt of £226,304 4s. 1d., £38,511 7s. 5d.; and in the corresponding period of 1840, on a receipt of £232,563 8s. 5d., £29,433 10s. 1d., or an actual diminution of expense, on a receipt larger by £6,000, of more than £9,000. The directors congratulated the proprietors on the exemption of the Grand Junction Railway from unfortunate casualties or accidents affecting life or property, at a time when some untoward occurrences on other lines have been made the ground of much exaggerated anxiety on the subject of railway travelling. The opening of the Chester branch, it was stated, has taken place since the last general meeting. Hitherto the traffic on this line has not been considerable; but the arrangements now completed for the conveyance of merchandise from Chester, from the 1st instant, and the advancing season, may be expected to add materially to the income at Chester, both from this source and from passengers. A further reduction in the rates of carriage for goods, it appears, has been made since the last general meeting; the result of which has been an increase in the quantity as well as in the money receipt from this traffic. It is expected that the great advantages which the company have now secured to the public will continue to attend a still increasing and profitable business. On this subject the directors think it proper to state, in consequence of assertions to the contrary which have been hazarded, that the terms on which the merchandise business of the company is now conducted, although more reasonable than any before offered to the public, are such as to afford a fair remuneration to the company; and that, in deciding on the successive reductions which have taken place, as the company's means of accommodation increased, they have been guided by a conviction that the prosperity of the undertaking would be promoted by the increase of traffic created by such inducements. The additions which have been lately made to the passenger fares (but which have not raised them to a rate as high as is charged on other lines in connection with this railway) were deemed expedient, in consequence of the subtraction by other lines of part of the traffic on which the calculations of income, originally submitted to Parliament, were founded. The net income, it appears, after deducting all expenses, exclusive of the amount of the interest of the unliquidated debt now charged on the quarter shares at five per cent. on the stock, and equal to 12s. 6d. per share, is £137,481 11s. 9d. This, the directors

stated, would enable the proprietors to declare a dividend at the rate of £6 10s. per £100 share, and in proportion on the paid-up amount of the half-shares, and on the quarter-shares lately created. And this the directors accordingly recommended to the meeting. The treasurer read a correspondence which had lately taken place with the Postmaster General, from which it appears that the Post Office department are quite satisfied with the manner in which the mail service is performed by the Grand Junction company, both as to safety and despatch, and are convinced that it offers a freedom from accident which never was accomplished by the mail coaches travelling at their accelerated speed. The report and address were very favorably received.

The half-yearly report of the directors of the London and Brighton Railway promises that the line shall be opened as far as Hayward's-heath, within about sixteen miles of Brighton, at Midsummer next, and the entire line in the ensuing autumn.

Improvements in Railway Shares.—The Liverpool correspondent of the *Times*, writing on Saturday, after the meetings of the Liverpool and Manchester and of the Grand Junction railway companies, observes,—"A feature very gratifying to the holders of railway stock appears in the reports of these two companies, which is, that the Liverpool and Manchester company have reduced their expenditure, on the half-year, by the large amount of about £15,000; and the Grand Junction company about £9,000; and this reduction has taken place chiefly in the locomotive department. This circumstance is calculated to improve the value of railway stock generally, as the improvements by which this great saving has been effected will, no doubt, be carried into operation by all the leading companies.

The Stockton and Hartlepool Railway will be opened for the conveyance of passengers on the 9th of February.—*Gateshead Observer.*

Railway Calls.—In the Court of Queen's Bench on Wednesday, Lord Denman delivered judgment in the cause of the Aylesbury Railway Company against Thompson, for the payment of calls on a share purchased by him. Lord Denman said that two points had been raised, first, that there was no evidence to show that the defendant had been at any time a proprietor of the company; and secondly, that at all events he was only liable for the second of the two calls now sought to be recovered in this action. The evidence to prove his proprietorship was the transfer-book, where the memorial of the transfer was entered as of the 7th of April. It appeared that the call was made on the 6th of March, and became due on the 9th of April. The question of liability arose under these circumstances. The plaintiffs contended that the owner of the shares when the call became payable was the person to pay the call, and not he who was their owner when the call was made. The peculiar circumstances under which this call was made had not been contemplated by the act under which the company was formed; but, considering the whole form of the act, the Court was of opinion that the liability on the calls attached when the calls were made, and could not therefore affect the defendant, whose purchase of the shares occurred after the date of the calls. The amount of the damages must, therefore, be reduced to that extent.

RAILWAY ACCIDENTS.

Extraordinary Escape from Injury.—On Tuesday, as the half-past 4 o'clock train from Wootton Bassett-road, was proceeding between Reading and Maidenhead, the guard met with an accident, from which he most narrowly escaped with his life. It appears that the guard perceiving that one of the straps used for fastening the luggage on the roof of the carriages had got loose, and that the buckle end of it was striking against one of the windows, passed on to the carriage, from which the strap was hanging, for the purpose of removing it; and when attempting to throw it on the roof the door by which he was holding suddenly opened, and he consequently fell backwards on the railway. The accident not having been observed by the engineer, the train still proceeded, and the guard was not missed until it arrived at Maidenhead. The guard escaped with only a trifling injury to one of his legs.

Fatal Accident in Tunneling.—On Wednesday an inquest was taken at Salter's Brook, near Woodhead, on the body of Thomas Cooke, aged 40 years, a sub-contractor on the Sheffield and Manchester railway. It appeared from the evidence of Moses Millington, an engineer, and other witnesses, that about 6 o'clock on Sunday morning the deceased had set a blast, and lighted it at the bottom of shaft No. 3, and called out "Go on." Cooke was seen to get into the hoppit or basket, and when he had ascended between 20 or 30 yards up the shaft, the hoppit caught under one of the horse trees, was turned partly over, and Cooke precipitated to the bottom of the shaft and killed instantly. The jury were satisfied that the deceased had come to his death accidentally, and returned a verdict accordingly.—*Doncaster Gazette.*

Fire in a Railway Carriage.—Wednesday morning, a fire broke out in one of the trucks of Messrs. Carver and Sons, carriers, on the Manchester and Leeds Railway, and goods to a considerable amount were destroyed. The truck formed part of the first morning train from Leeds, and the fire was discovered when it got about five miles from that town, but not in time to save the property, which consisted of stuff goods and fine woollen cloths, of the weight of five tons, and consequently of great value. The accident is supposed to have been occasioned by the falling of a spark from the engine chimney.—*Halifax Express.*

FOREIGN RAILWAYS.

Strasburg and Basle Railroad.—We quote the following from the *Courrier Français*:—"The Strasburg and Basle Railroad Company has just received from the Bank of France a sum of 4,200,000f., on a warrant from the Treasury, being the first of the three instalments of the 12,600,000f. which it is known the French Government is authorised to lend it. Some merely formal impediments had delayed this payment, but it is only justice to acknowledge that the Ministers of Public Works and Finances did all in their power to remove them. The company, therefore, is about to adopt additional means of carrying on their works. Those already completed by the contractor are, it is said, about 28 40th parts of the whole, and are executed in the most solid manner, nothing being spared to render them durable as well as grand. We may hope, therefore, that in the course of next summer we shall see the whole line, from Strasburg to St. Louis, opened to the public.

Italian Railroads.—The Italian papers contain a report of the traffic on the Milan and Monza railroad, which states the number of passengers from the 18th of August to the 31st of December, four months and a half, to have been 158,218—receipts 155,659f. 25c. In noticing this result, the *Gazzetta di Milano* calls attention to the satisfactory circumstance that not a single accident has occurred on the railroad since it was opened, and in conclusion observes—"It is truly gratifying to be able to refer to so brilliant a result of the first undertaking of this kind in the Lombardo Venetian kingdom, as it will doubtless add to the powerful inducements which recommend the execution of other railroads for rapid communication between the principal towns of the country."

MODE OF RETARDING A RAILWAY TRAIN.

To the Editor of the "Inventors' Advocate."

Sir,—Many of the accidents that happen on railways arise from the want of an efficient mode of retarding the carriages; for by the present system a man must be stationed at every break or drag, and as but few guards can be employed on each train, a very insufficient number of breaks are brought into action upon an emergency. I have therefore endeavored to meet the deficiency by an arrangement, a description of which I send you, in hopes some of your correspondents will give us their remarks on its merits; and should no insurmountable objection be found to the contrivance, it may perhaps be adopted on the several railways, and be the means of preserving many lives.

Let every carriage be provided with a break to each of its wheels. The four breaks to be united by a simple mechanism to one communicating bar, and when the carriage is attached to its neighbour in the train, let this bar be hitched on to the working bar of the breaks of the carriage in advance, and a like communication continued between the breaks from the rearmost carriage throughout the whole line to the engine: here it must terminate in a band, or chain, wound round a barrel, having a friction wheel upon it, which can by a simple contrivance be thrown into gear, that is put into connection with some revolving part of the engine. When the engineer wishes to stop the train, he throws the winding barrel of the breaks into gear, the engine winds it up, the breaks press on the wheels of every carriage in the train, and effectually prevent them from turning round. Those conversant with the mechanism of a friction wheel will perceive that the engine can go on working without overwinding, and thus destroying the connection of the breaks; because when the strain has become sufficient, the friction wheel remains at rest, although in gear, with the engine in motion.

The communication between the several carriages must of course be sufficiently long to allow of the requisite extension of the train by curves on the road, or otherwise.

I am, Sir, yours, &c.,
Martyn Roberts.

Norwood, Surrey,
Feb. 2, 1840.

TO CORRESPONDENTS.

The notice of "J. W.," *is not suitable to the columns of the* "INVENTORS' ADVOCATE."

The new invention, mentioned by "An Engineer," *has been already noticed.*

In the Six Months' List of Patents, published last week, the name of Mr. HANDCOCK, *the patentee of the turn-tables for railways, and castors for furniture, was incorrectly printed* "Hancock."

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of to-day.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 20 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes containing the Nos. of every 6 months.

Vols. 1, 2, and 3, handsomely bound, are already published.

*** *We have received from Brussels,* a List of Patents annulled in Belgium, during the last half-year; *but it being too long for insertion in our columns, it is filed at the* PATENT OFFICE, 198, STRAND, *for the inspection of those interested.*

THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, FEBRUARY 6, 1841.

We hope the present session of Parliament will not be permitted to proceed much farther without an effort being made to remedy the defects of the patent laws. We confess, however, that we do not perceive any reasonable ground on which to found an expectation that such will be the case; on the contrary, there appears to exist on the part of some of the members of the House of Commons who usually advocate the cause of the working classes, a strong and unaccountable prejudice against the right to property created by mental labor. We last week noticed the speech of the French Minister of Public Instruction, when introducing the Copyright Bill into the French Chamber of Deputies, in which he maintained that the natural right of an author to the produce of his own mind is stronger than any other right to property in existence. This doctrine we find is impugned by the opposers of Mr. Sergeant Talfourd's bill in the House of Commons; and we are astonished to see that those members who usually carry their notions of reform and of popular rights to an extreme range, deny the existence of neutral rights, when the property of the mind is at issue. It was, idly enough, attempted to disparage the argument of natural right to the property of the mind, by putting in competition with it the alleged right of all men to the articles which are the produce of their hands. If, indeed, a man procure all the materials and tools used in the articles he manufactures, then no one would deny his sole right to the property; but when, as is generally the case, the materials, the machinery, and the workshops, are the property of the employer who pays the workman for his labor, the latter has no claim whatever on the produce of his hands, the right to which rests entirely in the person who has purchased the materials, the tools, and the labor, wherewith they were made. The right to personal property so acquired is, we contend, much stronger than the conventional right to land, on which every inhabitant of a country has a natural claim; but even this right must cede preference to the strongest of all possible rights to property—that it is the produce of thought.

If we are disposed to confer on authors the greatest security obtainable for property in their writings, the same principle urges us to insist, and with even more force, on the necessity of giving to inventors security for the enjoyment of the property they create. In the case of inventors, it is not only the labor of the mind, in conceiving and maturing the plan of an invention that has to be compensated, but the remuneration for the cost of numerous experiments and models made at great expense, attended too frequently with loss, and always with great anxiety. These considerations give an inventor a claim to the exclusive possession of the produce of his labors, preferable to that of authors to the produce of their pens; strong as we are willing to admit the latter claim to be. But, instead of being placed in a superior position, as regards protection for the work that has cost him probably years of thought and care, and has exhausted his means, the inventor is obliged, at the very outset, to pay largely to government officials, for that protection which in all other cases is granted as the right of every one of the Queen's subjects. How uncertain, after all, is the protection afforded the poor patentee, for the dearly-bought privilege! It only amounts to placing him within the pale of the law! He pays largely for the acknowledgement, that the exclusive produce of his mind and of his hands is his legal property; and that recognition is all the patentee obtains. It must be remembered, too, that unless the invention be of use to the public, it is of no value to the patentee; and that the discouragement given to inventors, by placing them beyond the pale of the law, until they pay specially for its protection, has a strong tendency to prevent those improvements in our manufacturing processes, on which the national prosperity and national existence even depends.

The injustice which inventors suffer from the patent laws presents an ample theme, on which we shall have frequent occasion to dwell during the Session of Parliament, with a view to direct the attention of the Legislature to what is really as much a national injury as it is an individual wrong.

The Government measure for the regulation of railroads, was submitted to the House of Commons on Thursday night, having been preceded by a long report from the railway department of the Board of Trade. The principle on which the bill is founded, appear to be perfectly sound. The object of the measures is to steer clear of the two difficulties, of leaving the management of railways entirely without Government control, on the one hand, and of interfering in such a manner as to diminish the responsibility of the railway directors on the other. The chief provisions of the bill relate to signals, the preservation of discipline among railway servants, the establishment of fixed regulations and time-tables, and, more particularly, to the licensing of the engine-drivers. The principle on which the measure proceeds is, to compel all railway managers to carry into effect those regulations which experience has proved to be best calculated to prevent accidents. The Government at the same time requires to be authorised to exercise a general control.

To the principles of the bill we conceive no objection can be raised by the railway directors on the best regulated lines, for with them the proposed interference will be almost inoperative, as the provisions of the bill have been already generally adopted. The plan of licensing the engine-drivers, if those persons are to continue to have the sole conduct of the trains, is an excellent precaution, that will meet with general approbation. We must reserve all remarks on the details of the measure until the bill is printed, and its bearings can be examined more closely.

NEW INVENTIONS.

SAFETY ROTATION RAILWAY.

The principle of this railway, though it has been made known partially for some months, has not hitherto attracted sufficiently the attention of the public. It is founded on reversing the ordinary relation between the carriages and rails; as the wheels are fixed to the road, and the rails to the carriage. The wheels are placed at a short distance from each other, so that the rails on each carriage will always be bearing on the peripheries of at least eight of them. All the wheels are to be kept in motion by fixed engines, at stations of one or more miles distance, as may be found to answer best in practice. The motion is communicated to the wheels by an endless band passing round two pulleys on each wheel. The carriage is so formed that the heavier part of it, for the luggage, is placed below the centre of the wheels, working between the lines, so that it is almost impossible for such a carriage to be overturned. The motion, it will be observed, is communicated by the peripheries of the revolving wheels acting on the rail fixed to the carriages, which are thus, as it were, suspended on the wheels. The velocity acquired will be in proportion to the rapidity with which the wheels are turned. The inventor contemplates being able to attain a speed at least equal to that safely attained on common railways. The carriages are intended to run singly; one after another, if required, but generally one carriage will complete the length of a station before another is put on the line. The advantages proposed to be gained by this extremely novel arrangement are manifold; and they are borne out by the calculations of some civil engineers of eminence. In the first place, the general cost of completing a railway on this plan is estimated at considerably less than that of forming railways as at present, because little or no levelling or tunnelling would be necessary. The iron work would of course be much more expensive, on account of the series of wheels and pulleys; but the saving in the formation of the line would, it is calculated, much more than cover this additional expenditure. In the next place, greater safety would be attained, because no overturns could take place

nor could any collisions occur. Thirdly, the annoyance and danger of locomotives would be avoided. Fourthly, the expense of working the wheels by stationary engines, it is estimated, will occasion a great saving of expense. These advantages, if attainable by this plan, there can be no doubt will render it a most valuable improvement on the present system. A company has, we believe, been formed for the purpose of giving it a trial on a short line, which will be the best test of its merits. The disadvantages it has to contend with will, at first sight, appear to be the constant waste of force in keeping a long series of wheels in motion, when only eight or ten are in useful action at a time. This, of course, has been taken into consideration by the inventor, and calculations have been made by him and by Mr. Hawkins and by Mr. J. R. Bakewell, to ascertain the loss from that cause. The result is much in favor of the plan of the rotation railway; as the great saving of the weight of the locomotive compensates for the loss of power in turning the wheels. The liability of the endless band to wear out is also a consideration in balancing the probable advantages and disadvantages of the proposed system; but this we believe has been also calculated by the engineers, and it is not expected to prove a serious obstacle to success. We are anxious to see the plan in actual operation, for if it answer in practice the expectations of the inventor as to cheapness and expedition, it will afford greater safety and less annoyance than locomotive engine trains.

NEW ROTARY ENGINE.

A new rotary steam-engine, for which Messrs. J. J. Corde and E. Locke, have taken out a patent, is about to be put in operation. The distinguishing character of this engine is a revolving wheel, enclosed within an exhausted cylindrical box, or case, conforming to the circumference without touching it, and impelled and turned rapidly round by a continual current of steam, entering with force and velocity into the exhausted space wherein the wheel is situated, and impinging against suitable vanes at the circumference of the wheel, in the direction of a tangent, to the circumference. The box being connected by an eduction pipe with a condenser, which is kept cool by means of cold water, so as to exhaust the steam from the box at that part of the circumference of the box where the steam ceases to act against the vanes, and that condenser having an air-pump capable of continual action, in order to keep up the exhaustion. The power exerted by this engine being communicated from the axle of the revolving wheel to give motion (by intervention of wheel-work and such other means of communicating motion as may be suitable) to any mill-work, or machinery, which is intended to be impelled by the engine. The patentees have now nearly completed an engine, of considerable power, which will shortly be erected in London, and submitted to public notice.

TRAPEZIUM PADDLE WHEELS.

The object of this invention, for which a patent has been obtained, is to do away with the defects of the common rectangular paddle-wheel, arising out of its great width, weight, and indirect action, and to substitute in its place a wheel which, while it retains the simplicity, obviates the defects of the common paddle-wheel. The trapezium paddle-wheel differs only from the common paddle-wheel in the form of its floats, which are trapezoidal or spear-shaped, and in the greater simplicity of its construction. The advantages which are stated to be derived from this form are a wheel of one-half the breadth, one-half of the weight, and one-half of the surface of the common rectangular paddle-wheel. A series of experiments has been tried to test these advantages on two separate steam vessels, in opposition to their usual wheels. From the peculiar form of the floats, they enter into the water with the pointed part of the float downwards, and thus gradually arrive at their full horizontal action without shock or vibration, while, after the stroke, they, in the reverse manner, quit the water without raising any portion of it behind. Of course the advantages, arising out of the diminished breadth of a vessel fitted with trapezium shaped floats, will be, less space occupied in a river, basin, or lock; less surface resistance to a head wind, by all the breadth of one wheel; lighter draught of water by the diminished weight; less oscillation sideways, and consequently less liability to occasion damage to the engines. The shocks and vibrations now experienced by the striking of the edges of the rectangular paddle-wheel against the surface of the water, and the loss of power occasioned in consequence by the oblique action of the wheels, both in going into and out of the water, will, it is asserted, be entirely prevented by this invention. In addition to these advantages, the trapezium paddle-wheel will work nearly as efficiently when deeply immersed as when immersed to the usual depth, thus enabling the wheels to work with nearly the same facility at the first as at the last part of a vessel's voyage. All these advantages are obtained without the aid of wheels, eccentrics, or complicated levers of any kind, but simply by an alteration in the form of the floats.

STEREOTYPING BY GALVANISM.

From the German papers it appears, that the electro-galvanic process has been applied by Herr von Puttkammer, the editor of a Berlin periodical called the *Volkfreunde*, to the making of stereotype plates for letter-press printing. The saving is said to be considerable, as the value of the sulphate of copper precipitated is trifling compared with the expense of casting plates in type-metal, especially as the copper-plate may be taken out of the sulphate trough when very thin, and can be made of any desired thickness by laying a coat of melted lead on the back.

NEW PROCESS OF COPYING STATUES, &c.

An ingenious instrument, ascribed to M. Collas, has been invented in France, which professes to copy, without the assistance of an artist, and with extreme correctness, any medal, bas-relief, or statue, whether of wax, plaster, wood, marble, or metal; to reduce or enlarge its dimensions without impairing the harmony of its proportions, and to copy it on wood, stone, ivory, or marble, with an accuracy such that the artist himself could not distinguish the original from the copy. All this the Collas process is stated to accomplish easily and at an inconsiderable cost. "We have already admired," says a Paris journal, "the bas-reliefs of the Parthenon, the originals of which are in London; the Venus of Milo, still so beautiful, despite of her mutilation; and several other precious models, reduced to proportions of two-fifths or a half, with a truth scarcely conceivable. The Parthenon *metopes*, those venerable monuments of art at its origin, are moulded in plaster, with their parts worn by time and their mutilated projectures. We have also remarked several large bas-reliefs reduced upon steatite to the proportions of a cameo. Nothing is wanting in them. The most fugitive details of the model are seen with a lens in those charming copies."

ASTHMA BREAST PLATE.

A neat lamp has been invented by Charles Henry Ackerley, Esq., of Her Majesty's navy, for the relief of persons afflicted with asthma. The merely suspending it against the chest, and the inhaling of the warm air through the nostrils (the lips are to be closed), is said to afford instantaneous and effectual relief to the sufferer. The light used is wax candle, and on entering a dwelling from the air, where the lamp is no longer required for its medicinal purpose, it is available for a lantern to light the bearer about the house, by merely dropping the front slide. It is secured by patent, and will probably be adopted generally by those afflicted with that complaint.

APPARATUS FOR ASCERTAINING RAILWAY SPEED.

A correspondent of the *Liverpool Mercury* makes the following suggestion of a plan for ascertaining the speed at which the locomotive engines on railways are moving, that in case of accident it may be ascertained whether it arises from overspeed or from some defective machinery. His proposal is to fix an apparatus to each engine consisting of some sort of clock-work, to be worked by the machinery in such a manner as to ring a bell at the end of every mile traversed, and to have a clock or time-piece put up in a conspicuous part of the train, so that the time between each stroke of the bell, or, in other words, the time occupied in travelling each mile, might be ascertained with certainty, and hence the rate of speed made known; in addition to this index to the speed, that each train be provided with the means of being instantly detached from the engine, in case the rate of motion, from whatever cause, were increased, so much as to endanger the safety of the passengers. This would at least show to every one, if an accident should unfortunately happen, whether it was the result of overspeed or not,—a matter in itself of no slight importance; while it would afford to the conductor or guard a means of checking and regulating the operations of the engineer.

IMPROVEMENT IN LOCOMOTIVES.

We translate from the *Courrier Belge* the following description of a diminutive locomotive, intended to run on branch railways, where the traffic is not sufficient to pay the expense of railways on the large scale commonly adopted.

"When one project is successful it is certain to be followed by the adoption of other projects; the human mind is continually in quest of improvement and perfection. M. Arago predicted truly, when he said some years ago that railroads were capable of great improvement. His predictions have been verified; yet he has committed a great error in making use of such an argument in order to postpone the adoption of railroads in France; to do so is to render the improvements already made a means of preventing future improvements.

"Many journals have already alluded to the locomotive of M. Deridder; if we are not mistaken, the invention of this locomotive will constitute an epoch in the history of railroads. We have just descended from a train propelled by the small engine in question, from the station to the south of Forêt (4,500 metres), which we passed over in six minutes and a half, loaded with 80 passengers. The power of this engine, as compared with the ordinary one, is in the proportion of a horse to an elephant. No longer is there anything colossal or terrifying about such a locomotive; we feel that man is the master of this light courser; that he can govern and tame him as he pleases. It may be called the elegant English stage coach substituted for the heavy wagons of our ancestors. We make railroads; we have our Scheldt and our Meuse;—but we want capitalists to enable us to go on with our plans and to render our rivers navigable. M. Deridder is going to provide us with railroads on a small scale. We have already roads to the principal towns; we shall shortly have them to the provincial ones, by means of which all places of secondary importance will be connected with the great arteries, and will greatly contribute to their support.

"The economical plan of M. Deridder we are convinced will be well adapted to the scattered population of France, and to her limited trade. With respect to the coal pits, the mines, and large manufactories, they will derive great advantages from the very decided saving of expenditure which must apparently result from the lesser channels of communication, the importance of which M. Deridder so well understands. Without entering into the question, whether the accommodation of the public on the principal lines is best promoted by large and occasional trains, or by frequent and smaller ones, it may be said that in the latter case it is no longer

necessary to announce the hours of departure, and the passengers have only to go to the railroad to be certain of not having to wait longer than half an hour. This object would be entirely accomplished by making use of small and frequent trains containing upwards of eighty persons. It is remarked that in small trains of this description there is less danger than in those enormous ones, the motion of which it is so much more difficult to regulate. The road for the locomotive of M. Deridder is not more than a metre in width, which admits of a considerable saving in the length and breadth of the sleepers. His rails are constructed in such a manner as to prevent the necessity of having chairs and pins. They are not more than half the weight of the ordinary rails, that is to say, 12 kilogrammes instead of 25. Each wheel in operation has only to support one ton, while every wheel of the locomotives constructed on the ordinary plan has to support three. There is also a great saving in the land requisite for embankments and other works, and most particularly in the consumption of coke, which must necessarily be much less considerable in consequence of the expansive principle of steam being applied. M. Deridder was the first person who adapted this principle to locomotives. Hence it results that the engineer has three different degrees of power at his immediate disposal, according to the weight carried and the inclines of the railroad; for he can proceed either by half the quantity of steam, the full quantity, or the third part, so as to imitate the exertions of a horse, which is able for an instant to proceed with twice or thrice his usual speed to compensate for his previous slowness.

"In the *Deridder* locomotive the tender is placed on the same wheels as the engine, so as not to require flexible tubes to convey the water. Let us not forget to mention the ingenious idea of causing the steam to flow back into the tender when the escape from the safety valve indicates a superfluous pressure in the boiler. By this means the water is not only prevented from freezing in the pipes, which happened this winter on the Strasburgh railway, but it acquires a degree of heat which acts as fuel, since the water from the tender can be conveyed to the boiler almost at a boiling heat.

"It must be added that by a judicious arrangement, the cylinders and all the mechanism are placed under the immediate eye and hand of the conductor, who is able, even while the engine is in motion, to fasten or to unfasten a screw, to put oil when any is wanting, and to instantly perceive the slightest accident likely to damage any part of the machinery. Let us not omit to state that the piston rod being fixed to the rim of the wheels, does away with the use of the cranks, which are so difficult to forge and so expensive to repair. Neither is there a single part of the machinery concealed from view; even the eccentrics are visible and can be touched immediately. M. Deridder has not confined himself to the improvement of the engine alone; his experienced eye has perceived the mistake of high carriages on springs, which is a servile imitation of carriages on common roads. They are mounted in this manner to enable the wheel to move below the bodies of the carriages when turning.

"Instead of placing the feet of the passengers above the wheels, he adopts the plan of placing the seats at that elevation, so that his carriages are near enough to the ground to prevent the necessity of steps or ladders. By this means a number of accidents that continually arise from the height of the carriages, are prevented. This train is infinitely less exposed to winds, both from the sides and the front, because instead of five passengers in the front there are only three, a large surface is thus sheltered from the action of the air, which occasions more resistance than would be supposed. An application of no less importance is that of whole wheels without spokes; for it has been calculated that the addition of the surfaces of the spokes of only twelve carriages, is equivalent to a ventilator of at least six metres in breadth by forty-five centimetres of spoke surface in performing three hundred evolutions in a minute, and offering the continual resistance of many horses,

"M. Deridder estimates the consumption of coke by his small locomotive at 100 kilogrammes an hour, drawing eighty passengers at the speed of the usual engines; it possesses the advantage of being much more easily managed than those enormous masses, no part of which can be raised without machinery. Each of the details of this locomotive discovers a difficulty overcome, for almost every piece is an invention. For example, the wheels being made without being heated are no longer subject to break owing to change of temperature; and M. Deridder has also introduced a new safety valve."

THE GOVERNMENT REGULATION PLAN.

In the House of Commons on Thursday Mr. Labouchere moved for leave to bring in a bill for the better regulation of railways. We subjoin a report of his speech, which will fully explain the objects of the bill.

"The object of the bill was to afford increased security to the public travelling by railways. After the accidents which had occurred during the past year on railroads, he felt that it was incumbent upon the Government to consider whether by any interference on their part they could prevent the recurrence of accidents which had produced so much alarm in the public mind. If by such interference they could even diminish the chance of accidents, he should have deserted his duty if he had not proposed to the house a measure which would produce that effect. The accidents to which he had alluded had been naturally subjects of minute investigation by the railway department attached to the Board of Trade, and the report, which he had laid before the house a few days ago, contained so many of the grounds on which he introduced this bill, so fully and clearly stated, that it was useless for him to occupy the time of the house in repeating them. He should merely state some of the main principles of the bill. Its sole object was directed to the attempt to increase the safety of railroad travelling. He was aware that by injudicious interference they might increase the evil they attempted to remedy—that by taking away all power of control from the directors of the railway companies, and by minute interference with their particular province, they would attempt to do what Government could perform very inadequately, and the directors of railways much better. But upon some points the directors of railways were themselves of opinion that Government could interfere beneficially. There had been a great deal of exaggeration owing to the panic created by the accidents; but, on the whole, no mode of conveyance was so safe as railways. Considering the dreadful nature of the accidents, however, it was not at all wonderful that a great impression should be made upon the public mind, and it was for the interest of railway companies that the public should be satisfied by means being taken to diminish the chance of accidents, and he was convinced that measures might be taken (after looking at the reports of the causes of the accidents), without materially interfering with railway companies, to make travelling on railroads safer than it was at present. He would read an extract from the report, in which this part of the subject was well argued:—'With regard to the nature and extent of these powers, the proper distinction appears to us to be, that the Government should not attempt to interfere in questions of an experimental nature, which are still subjects of discussion, and admit of a fair difference of opinion amongst practical men; nor should it attempt to regulate matters of detail, so as to take the management of railways out of the hand of the parties immediately responsible —viz., the directors and their officers.' It went on to state instances, and it proceeded—'With regard to other points, such as the propriety of introducing upon every railway such arrangements respecting time-tables and signals, as experience has shown to be necessary for preventing collision, of establishing a proper and uniform code of regulations for engine drivers, guards, and other servants placed in a responsible situation, and for maintaining strict discipline, and generally of introducing upon all railways whatever has been adopted and proved to be conducive to safety by the practice of those which are considered to be the best conducted,' &c. Now, on most railroads time-tables were used, which regulated the arrival and departure of the trains; but on several time-tables had not been introduced, and on them it was found that frightful accidents had happened. He thought that a power might be intrusted to the Government board to enforce a principle so essential to the public safety, and to call upon all railroads to adopt it. There was another instance. On almost all railways a red flag was used as a signal of danger; this was almost universal. On some, however, another colored signal was in use. Now, a driver who left a railway where the red signal was used, and came upon one in which the signal of danger was of a different color, might be confused, and a collision might take place. He mentioned these instances to show wherein he thought a power might be given to a Government board to act upon its own responsibility, and, although he asked the house to give extensive power to the Board of Trade, it was a power which ought to be exercised with the greatest caution, and with as little interference as possible with the directors. Another point of great importance was this—to require that all engine-drivers on railways should be licensed. It was an anomalous state of things that the driver of a vehicle in the streets must be licensed, and that the driver of an engine on the railroad, who might by his misconduct endanger the lives of so many person, should be unlicensed. He proposed, therefore, that a licensing system should be established; that no engine-driver should be employed without a licence, and that for his misconduct he should be deprived of his licence. In a great many instances accidents were attributable to the gross misconduct of engine-drivers. There were other suggestions contained in the report; but when he recollected that the house last session had pronounced an opinion adverse to investing the Government with too much power, it was not his intention to ask it again."

LEGISLATIVE INTERFERENCE WITH RAILWAYS.

(*From the Morning Chronicle.*)

"The limits within which the Legislature can advantageously interfere with the new power of transit which has sprung up in the country, and made such rapid progress, are not very extensive; and the principles of such interference are by no means difficult to be defined.

"The shareholders have been allowed to acquire rights of property, in the provision made by them for public convenience, which it is now too late to question, and would be dishonorable to tamper with. The lines of railroad are the estates of the several companies, fairly purchased, and in many instances most dearly paid for. They are a property differing from other property in land simply in the conditions which the acts of Parliament under which they were bought may specify; and in their affording (from the nature of the purposes for which they are used) more scope for that general supervision which the Government is bound to exercise over whatever affects the common rights and safety of her Majesty's subjects.

"It is also incumbent on the Legislature, in dealing with railways, to bear in mind the necessity for a free and rapid communication with all parts of the country. This is one of the great essentials of national prosperity; we might almost say, of national existence. At the same time, the notion of keeping up old roads, and old modes of travelling, by putting a burden of taxation on railways, is so unfair towards the speculators by whose enterprise these gigantic schemes have been realised, so hard upon the poorer classes who have already entered upon the enjoyment of a new and

valuable benefit, and so much of a sacrifice of the general good to the interest, convenience, or caprice of a small class, that we trust, should it be attempted, it will be at once scouted.

"Above all, it is requisite to remember that this mighty invention is yet in its very infancy. Not only must the members of the Legislature be very imperfectly informed, but that is the case also with shareholders, managers, and, we fear, not unfrequently, with the engineers themselves. We have not had any opportunity for noticing, as we intended, a quarto volume by Mr. Wishaw, containing some very striking illustrations of this fact. The laborious author has collected every ascertainable particular relative to nearly sixty railways; and the result is an intermediate variety of forms in the engines, carriages, horse-boxes, wagon trains, iron rails, &c., as well as in the curves and gradients of the lines, aud the cost of construction. No certain principles seem to have been clearly ascertained or generally applied. All is one great experiment; and the arrangements have yet to be made for accurately ascertaining the results which may be already proved or proveable. The first want is that of full information. The next, of an experimental line, for completing and combining the fragments of knowledge already obtained. And then the subject will have better ripened for the work of the legislator.

"There is one point, however, and that a very important one, which admits and requires prompt attentiou. It is very practicable to secure the public, by Parliamentary enactment, against the employment of incompetent engine-drivers. The means of instruction, both theoretical and practical, previously to employment, have now so largely increased, that there can be no hardship, either upon the managers who have to form and keep up their corps of drivers, or upon the men who are candidates for that occupatiou, in requiring satisfactory evidence of competency before an appropriate tribunal. There is something absurd in licensing the cab or omnibus driver, aud taking no certificate of the aptitude of an engiue-driver for his incomparably more important trust. His unfitness is as perilous as would be that of the lawyer or the surgeon. To require every engine-driver to be licensed, by a board established for that purpose, after having been subjected to a strict examination, is one of the first aud most reasonable steps, in reference to railways, that Parliament can possibly take."

THE CONSTRUCTION OF IRON BRIDGES.

We translate from the *Echo du Monde Savant*, the following article on the construction of iron bridges in France, by M. Polonceau, whose improvements will be more particularly detailed in a subsequent number :—

"When we consider the superiority of iron bridges, says M. Polonceau, in his notice of the new plan of iron bridges invented by himself, and of which the bridge of Erdre (at Nantes) affords a good specimen, we are astonished that so few have been constructed in France, and even in England, where it is so much the custom to make use of iron, and where it is so plentiful. If these bridges are compared with stone bridges, it will be found that they are constructed with much less difficulty, and that they are considerably less expensive, and that when they have cast-iron roadways they are not inferior, if not superior to them in durability. In fact, cast-iron is more durable and more strong than stone; it is better adapted to bridges with large arches, because the weight of an arch in iron being much less than that of an arch in stone of the same span, the destruction of the piles and abutments is less to be apprehended, and on this account can be constructed at less expense.

"Compared with wooden bridges, bridges of cast-iron cost about a half less than bridges of that kind which have abutments in stone; but their duration is indefinite, and the keeping wooden bridges in repair is attended with great expense, while the cost of repairing iron bridges is a mere trifle. The difference of expense between solid iron bridges and that of well-executed suspension bridges is not so considerable as might be supposed.

"In endeavoring to explain the causes which have prevented these kind of bridges from being more generally used, continues M. Polonceau, we discover three principal ones which have been unfavorable to their general adoption.

"First—The great expense of iron, aud the uncertainty in the casting of the larger pieces, before the year 1830.

"Second—The great expense of the only two iron bridges constructed in France before that time. The cost of the *Pont des Arts* amounted to 900,000f., and that of Austerlitz to two millions and a half, not including the approaches.

"Third—The accidents, and repairs required by these two bridges.

"Those works of art were constructed on two entirely opposite principles. In the bridge of Austerlitz the arches, and the triaugular pieces above them which support the roadway, are composed of portions of the arcs iu frame-work, and are attended with all the inconveniences consequent on this plan; and further, these frame-work pieces are small, much ornamented, and are of unequal thickness, and to this may partly be attributed the accidents which take place.

"The plan of construction adopted in the *Pont des Arts*, which is composed of large arches connected together by pieces of iron, is more rational; but the principal arches are not sufficiently strong, and owing to the variations in the thickness of the castings the metal contracts and expands unequally. In each of these bridges durability has been sacrificed to lightness and elegance, which occasions frequent fractures in the least durable parts.

"Southwark bridge, in London, one of the most remarkable of the kind, is composed of portions of arches like the bridge of Austerlitz, but those are plain, and are not carved, although they are more than two metres high, and the method on which they are arranged is much superior to that adopted in the bridge of Austerlitz. The strength and entire preservation of the Southwark-bridge is to be attributed entirely to the great quantity of iron used, which was procured at enormous expense, and amounted to more than fifteen millions of francs. It is probable that the great expense of this beautiful structure has prevented its being imitated.

"The natural consequence of what has been stated is, that it is impossible to erect any more iron bridges in France, unless a new plan could be adopted of constructing them on more durable principles than those kind of bridges have ever been constructed, and at less expense than the English bridges. This double problem M. Polonceau has solved, by constructing on an entirely new system of his own invention the Carrousel bridge at Paris. It is on this plan of making bridges, now well known by the name of Polonceau bridges, that the bridge of Erdre is also constructed."

French Sugar.—From a table published by the *Moniteur* of the duties paid on indigenous sugar during 1840, and the state of the manufacture at the end of the year, it appears that the quantity made during September, October, November and December, was 13,999,684 kilogrammes; that the consumption during the same months amounted to 9,279,141 kilos; that the quantity remaining in the hands of the manufacturers at the end of December, was 8,823,199 kilos; and, finally, that the duties paid in the year, amounted to 4,557,493 fr., of which 1,985,550 fr. was for the four last months only.

The British Silk Manufactures.—The deputation of silk manufacturers and journeymen silk weavers, who waited a few days ago upon the Marquis of Normanby, through whose hands some specimens of British manufactured silks were conveyed to the Queen for her Majesty's approval, were informed that it was her Majesty's intention to patronise a fancy dress ball in May next, the object of which was to give encouragement to the production of British manufactured silks. Some patterns were placed in the hands of the deputation which had been selected by the Queen for her patronage upon the occasion. Some of the silks, which are of entirely new patterns, consist of rich brocade in silk, silver, and gold.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING FEBRUARY 8, 1841.

Monday,	Geographical Society	9 P.M.
	British Architects	8 P.M.
	Medical Society	8 P.M.
Tuesday,	Medico-Chirurgical Society	8½ P.M.
	Inst. Civil Engineers	8 P.M.
	Meteorological Society	8 P.M.
	Zoological Society	8½ P.M.
Wednesday,	Royal Botanic Society	8 P.M.
	Medico-Botanical Society	8 P.M.
	Society of Arts (Illustration)	8 P.M.
Thursday,	Royal Society	8½ P.M.
	Society of Antiquaries	8 P.M.
	Royal Society of Literature	4 P.M.
Friday,	Astronomical Society	8 P.M.
	Royal Institution	8½ P.M.
Saturday,	Westminster Medical Society	8 P.M.
	Mathematical Society	8 P.M.

ROYAL INSTITUTION.

Jan. 29. Friday Evening Meeting.

According to announcement, Mr. E. W. Brayley, jun., delivered a lecture on the history of an important and interesting cla s of mineral substances, originating from organic bodies, principally, however, from the vegetable kingdom, and becoming new denizens of the mineral world,—in other words, on "Bitumen and its compounds."

He commenced by giving the history of the various substances known as bitumen, and explained the views entertained by geologists as to the formation of coal (some account of which will be found in our number before last in the Scientific Memoranda, and which it will not be requisite to repeat here). Mr. Brayley alluded to a company which was a short time back formed for the purpose of manufacturing fuel from the refuse gas tar which abounds at the gas works; and that this gas company, whose works are not far from the institution, entered into a contract, and supplied the fuel-makers or projectors with one million of gallons of coal tar, which even to the present day has not been turned to account.

Bitumen and coal are very often confounded with each other. The composition of all coal is vegetable matter subjected to heat under pressure, and buried in the earth. He explained anthracite or stone coal as being coal acted on by water alone, without the assistance of air; some varieties of anthracite appear to pass into graphite or blacklead, but all the varieties of the coal retain a portion of their original woody texture and cellular tissue, according to Dr. Hutton, even the anthracite. This, however, is not the case with bitumen or mineral pitch; which, although it originally possessed organic origin, no traces whatever of it remain, which distinguishes it at once from coal—it is composed of carbon and hydrogen. It was stated that the late Dr. M'Cullock anticipated for some time the results which modern investigation has proved; and he was of opinion that there exists a gradual transition from naptha, through the solid bitumens, to the driest coal. This is, chemically speaking, correct; but, viewing these substances mineralogically, their structures separate them. The lignin of the vegetable it is which becomes resolved into coal, and the resin of these vegetables into amber; this substance being little more than vegetable resin, slightly altered in its properties.

The lecturer then gave a history and general remarks on a whole catalogue of compounds of carbon and hydrogen, with oxygen occasionally entering into the composition of some of them—we give some of the most interesting remarks offered in the order in which they were severally noticed.

Oil of turpentine is distilled from turpentine itself.

Pinic acid is a pure resin obtained from coniferous trees (pines)—it contains oxygen.

Creosote is obtained by the destructive distillation of all organic subtances, either animal or vegetable. It has the property of preserving animal substances from putrefaction; and it has been presumed that the mummies of the Egyptians were partially con-

verted into this substance after their bodies had been soaked in some bituminous compound, and subjected to heat.

Napthaline is a compound, with the three following, of carbon and hydrogen only; it was first discovered by Dr. Kidd, and its properties recently investigated by Mr. Faraday.

Idriadine is a very rare substance found in the ores of mercury in Idria, &c. &c.

Naptha and oil of turpentine are supposed to be the same in their chemical composition. By the distillation of lignite Reichenbach obtained naptha.

Petroleum is contained in solid bitumens associated with another substance.

The analysis of petroleum of Bechelbronn in the Bas Rhine gave—

Petrolene	85·4
Asphaltine	14·6
	100·0

Hatchettine is obtained from the iron and coal mines of Wales and Cornwall; it was first described by Mr. Brande.

Ozocerite or Fossil Wax occurs in Moldavia, and specimens have recently been found in collieries in Northumberland. Professor Graham lent Mr. Brayley for exhibition a candle made of the fossil wax from Linlithloe, near Glasgow, which Mr. B. did not presume to light. Magnus was of opinion that this substance was composed of paraffine.

Paraffine, Eupion.—Substances distilled from tar and naptha.

Highgate Resin or Fossil Copal was first obtained from the beds of the London clay when cutting the Highgate Tunnel; it is found also at the Isle of Sheppey, and in other tertiary deposits.

Elastic Bitumen—The French botanists and geologists were inclined to infer that, because this substance was found in magnesian limestone of Derbyshire, and from its general resemblance to India-rubber, that vegetables must have existed in those situations which yield caoutchouc—this however is altogether unfounded.

Middletonite was merely alluded to.

Retinasphaltum is found in wood, coal, and sparingly in other situations; it is intermediate between the resin of wood and a mineral; it was first described by Hatchett, and afterwards investigated by Johnson. Creosote and retinasphaltum are isometric in their composition; that is, they are composed of the same elements and in the same or nearly like proportions.

Retinasphalt. of Bovey, Sp. Grav. 1·315 is composed of—

Resin	59 32
Insoluble	0 0
Organic matter	27·45
White ash	13·23
	100 00

Asphalte is obtained from Cuba, Trinidad, &c.; it softens and melts by heat; is inflammable, &c. The analysis made by Klaproth of the asphalte obtained from Albania, gave—

Sp. Grav. 1·205.

Heavy carburetted hydro. gas 36 cub. in.	16
Very fluid bituminous oil	32
Water with a trace of ammonia .	6
Charcoal	30
Silica	7½
Alumina	1½
Linic	¾
Oxide of iron	1¼
Oxide of manganese	½
	98½
Loss	1½
	100

Asphalte of Bastenne and Gaujac is of Sp. Grav. 1·21.

Portion soluble in ether (asphalte and petrolene?)	67
Portion insoluble in ether (charcoal? It is entirely insoluble in oil of turps)	33
	100

A specimen of asphalte was shown, taken from the collection in the museum of the institution, imbedded in an ore from Cornwall; and it is even supposed to occur in the primary rocks, whose composition Mr. Brayley was inclined to be of recent origin, and stated that they took their place on the globe long after the existence of animals and plants. By some the great source of all carbon is supposed to be derived from organic matter. The asphalte it appears has been long known to the Arabs, who constructed many of their dwellings with it, the remains of which are still to be observed in that country.

America furnished a good deal both of solid and liquid bitumen. In the bituminous lake of Trinidad there is a continual bubbling of asphalte, which, rising to the surface of the water, becomes solid on exposure to the air. In Cuba it occurs in a rock of chlorite and mica-slate, in a kind of dyke, the great source of which must have been from the lower strata.

On the table were several specimens of asphalte obtained from the Bastenne Company; they all depend on the mixture of various bitumens with quicklime, fine sand, or gravel.

There was nothing of interest on the library table. The lecture announced for next Friday was, Mr. Samuel Birch, "On the Hieroglyphics of the Egyptians."

MICROSCOPICAL SOCIETY.

Jan. 27. Professor Owen, F.R.S., &c., President, in the Chair.

The names of the gentlemen proposed to fill the places of the retiring members of the council were read from the chair, and Mr. W. Greening and Mr. Reynolds were balloted for and elected auditors for the anniversary meeting on the 15th February. Professor Ehrenberg was nominated by the council for election as the first honorary member. The chairman having vacated the chair for the time being to Mr. N. B. Ward, he made a few verbal observations "On the Structure of the Teeth of Extinct Reptiles;" specimens of which were exhibited after the meeting, under the microscope. These remarks were made by Mr. Owen at the last meeting of the Geological Society, and as they were connected with microscopic researches, he ventured verbally and briefly to explain the results of his researches. The teeth of reptiles (especially recent) hitherto examined exhibit a very remarkable simplicity of structure; but in extinct forms, among the fossil Saurans, such as the *Iguanodon*, the discovery of which is due to Dr. Mantell, and a variety of teeth obtained from the sand stones of Warwickshire, &c., they exhibit, when viewed under the microscope, a remarkable and interesting arrangement of the three structures of which the teeth are composed, and arranged in a definite though somewhat contorted manner.

The president having resumed the chair, Mr. J. S. Bowerbank read his paper "On the Structure of the Horny Sponges of Commerce;" a subject on which Mr. Bowerbank has been for some time very actively and attentively engaged. Little was known as to the true structure and nature of sponges prior to Dr. Grant's observations, published in the *London and Edinburgh Philosophical Magazine*, 1827, in which he describes their form, structure, and mode of propagation, and considers them to be nearest allied to the corals; proving, at the same time, without a doubt, the animal nature of the sponge. Mr. Bowerbank has followed up and confirmed many of Dr. Grant's observations, adding much new and important matter connected with these, supposed, by some, to be animals, and by others vegetables.

Dr. Fleming, in describing the sponge (*spongia*), states, that they are "porous bodies, possessed of a cartilaginous skeleton, simple in their nature and destitute of earthy spiculæ." Mr. B., however, has clearly proved that these characters are now fallacious. On examining the living sponge of commerce,—the sources of which are from the Mediterranean (the Turkey sponge) and the West India Islands, principally Bahamas,—with a power magnifying 500 linear, spiculæ are most evident, imbedded in the fleshy matter, and he is inclined to believe that there are very few without them. These spiculæ are composed of silex, and are obtained separate from the animal substance by burning the sponge, digesting the residuum in weak muriatic acid, and then examining them under the microscope. In the white sponges the *spiculæ* are composed of *carbonate of lime*, and when so treated are of course dissolved. The *siliceous spiculæ* are however hollow and cylindrical, though not solid and angular, as stated by some observers. When subjected to the action of the flame of the blowpipe, the hollow part, examined by a power of 500 linear, exhibits a dark carbonaceous appearance on the interior, produced by the destruction of the animal matter. This is also occasionally to be seen in the exterior of the spiculæ. The terminations or extremities are beautifully transparent. They have been likened by Professor Rymer Jones to the *raphides*, or crystals, found in the cells of plants; but Mr. B. cannot trace any analogy with these bodies, as they are angular and solid, and have not the same functions to perform as the spiculæ or skeleton of the sponge has. The occurrence of *spiculæ* in the *Spongia fistularia*, led Mr. B. to separate it from its present group in the system, and to adopt the new name of *Fistularia* for the genus. Mr. Owen asked Mr. B. if he had ever observed projections or barbs from the side of these siliceous spiculæ of the sponge, to which he replied he had, although only in one kind.

The sponges of commerce are usually prepared before they come to the market, by being beaten and soaked in dilute muriatic acid with a view to bleach them, and to dissolve any adherent portions of carbonate of lime. Three kinds are found commonly in the market, and known as, the Turkey, the variety of the same, which is very rare, and the West Indian.

On examining the living sponge of commerce with a power of about 500 linear, the fleshy matter will be distinctly observed, having in its interior gemmæ, which are considered to be the young. These are occasionally given off from the mass of living matter. The greater portion of the mass of sponge consists of small cylindrical threads, or fibres, various in size. The spiculæ are not found within these, but in the large and flattened fibres and varying in number from one to three or more, imbedded in their substance. Sometimes one spiculum projects a half or more from the side of the fibre, and is then only covered with the animal matter at the base, or half way up. The fibres of the West Indian species of sponge have been clearly proved by Mr. B. to be solid.

In the rare variety of Turkey sponge, the fibres are possessed of vessels which anastomose in various directions, differing much in size, and not imbedded in horny fibre, but in a separate sheath. Mr. B. considers that this true vascular tissue performs very important functions in the economy of the animal during life. In some of the tubes of sponge he observed small globules, the largest of which measured the 1666th of an inch, and the smallest the 50,000th of an inch. He is convinced that they shift, as by accident they were perceived to move from right to left.

Mr. Bowerbank exhibited a very splendid collection of sponges from Sidney, &c., and several gentlemen attended with their improved microscopes, and exhibited many interesting objects.

The anniversary meeting of this society was announced for the 15th of February, and the ordinary meeting for the 17th of the same month.

LINNEAN SOCIETY.

Feb. 2. Edward Forster, Esq., F. R. S., V. P., in the Chair.

After the reading of the minutes of the preceding meeting, the chairman stated that the council had drawn up an address congratulating Her Majesty on the past occurrence, and also one of a similar nature

to Prince Albert, which they submitted to the meeting, to be sealed by the seal of the corporation, and to be presented in the name of the society. A letter was read from R. H. Solly, Esq., stating that he had asked Mr. Ross to attend in the museum after the meeting with his improvement for steadying microscopes, which is a subject of much importance to the naturalist, when examining objects under high powers. A paper was read, "On the Existence of peculiar Organs in the Pitchers of the Pitcher Plant," (*Nepenthes Distillatoria*,) by Professor Don. On examining attentively the interior of the pitcher, it may be observed that the lower half is of a green color, while the upper is of a purple hue. The cuticle of the green portion is composed of a double layer of cellules, and covered with organs very analogous to the *stomata* (breathing pores) of plants. These openings are of an oval form, of a yellow color, and composed of minute cells of cellular tissue, with an elevated border, which is continuous with the layer of the cuticle, and are readily separated from the rest of the tissue, leaving on their separation a hole. They do not occur in the genera *Sarracenia* and *Cephalotus*. The Professor proposes to give them the name of *Clathrapores*, from their resemblance to lattice work. They no doubt perform some particular function in the economy of the plant; and it was conjectured that they might possibly be the mouths which throw out the water found in these pitchers, or that they might assist in the function of respiration. The remaining portion of the communication was entirely anatomical.

A descriptive Catalogue of the *Cyperaceæ* (sedges) and *Gramineæ* (grasses) contained in the Herbarium of Professor Royle," by Nees Von Esenbeck, was read. The plants enumerated were collected in the western range of the Himalayah, and contained many new genera and species. A paper was also read from Mr. J. O. Westwood, being descriptions "Of new Homopterous Insects, belonging to various sub-genera of the genus Derbe," most of which are contained in the cabinets of the society. Three deaths having taken place among the foreign members during the past year, three others were nominated by the council to be balloted for at the anniversary.

VARIETIES.

Port of Southampton.—The increase of the Customs duties for the last two years at Southampton, has been upwards of £30,000.—*Hampshire Independent.*

New War Steamers.—Of the five new war steamers of a large class which have been built in her Majesty's dock yards, and are to be immediately fitted for active service, the first has arrived in the river, and is now lying at the Isle of Dogs. She is a majestic vessel, of the same class as the Cyclops and Gorgon, lately found so effective in active service. She is to be fitted with two engines of 140 horse power each, and her tonnage is about 1,400. She is named the Driver. Her engines are furnished with all the recent improvements, especially that important one which will enable her to connect or disconnect either one of her paddles in an instant, and thereby change her position with equal celerity. It is said that she will be furnished with two long 98 pound guns on her upper deck, working on swivels, besides other guns of a large calibre on her lower deck. It will be observed that the steam power of the Driver is 20 horse power each engine less than the Cyclops and Gorgon; but the peculiar build of the vessel and the improvements in the engines will, it is stated, place her on a perfect equality with those war steamers. The Driver will be completed in three months, and the four others, two of which are named the Styx and the Vixen, will also be fitted with boilers and engines in the course of the year, the machinery for that purpose being already in a very advanced state.

Shannon Improvement Commission.—We learn, that at last the practical works of this important undertaking have been commenced in earnest. On Wednesday, the two steam dredging machines, which have been for some time in preparation at Shannon harbour and Banagher, being quite completeed and ready for operations were started on the shoals of the river near Banagher; and, judging from their very efficient duty at the time of trial, no ill-grounded anticipations may be formed that ere long the shoals and fords which constitute such obstacles to the free and uninterrupted navigation of this magnificent river will be speedily cleared away. One of the machines removed thirty-eight tons of the hardest clay, with gravel intermixed, in the short space of twenty minutes. In addition to the dredging operations, the works at Killaloe, Meelick, Banagher, and Athlone, which have been contracted for by William Mackenzie, Esq., and Messrs. Mullins and Macmahon, will be vigorously commenced early in the spring; so that when these works shall have been completed, a direct and speedy communication will be opened between Limerick and Tarmonbarry, through Athlone; besides relieving thousands of acres of valuable land, which are at present annually inundated to a grievous extent.

A Fact for Naturalists.—The extreme thickness of the ice occasioned by the late severe frosts induced Mr. Dwarvis, of Gotha Lodge, In this town, to put his gold and silver fish into tubs. The pond having been emptied of its ice, was in a short time filled again by the heavy fall of snow, which fell soon after. The rain which followed dissolved the snow, and the fish were returned to their former abode, but such was the effect produced by the snow water, that every fish, both large and small, went blind immediately, the eye becoming as white as that of a boiled codfish; several have died, and there appears very little chance of any of those that are still alive continuing long to survive. *Cheltenham Looker-On.*

Worms destroying Ships.—The brig St. Nicholas, but very lately built at Taganrog, and now at anchor at Salta, was fifty-six days at anchor at Sebastopol, and during that time all its side-planks were so pierced by these formidable insects, that they look exactly like a sieve. Covered with innumerable boles, the entire outside of the vessel, if a part is broken off, resembles a spongo, and it is quite unfit for service.—*German Paper.*

On the Green Color of Plants.—Although we are justified by the mass of evidence in asserting that the green color of plants is owing to the fixation of carbon in their tissue, in consequence of the power that light possesses of decomposing their carbonic acid, yet there are some exceptions that deserve attention. Humboldt found 'that *Poa annua* and *P. compressa* (two grasses), *Plantago lanceolata*, *Trifolium aruense*, (clover,) wallflower, and the *Rhizomorpha verticillata*, were *green* in the subterranean galleries of the mines of Freyberg, although horn in *total darkness*, but in atmosphere highly charged either with hydrogen or nitrogen. Ferns and mosses again will be green when other plants are *blanched;* and Humboldt found near the Canaries a fucus (*sea weed*) which was bright grass green, although it had grown at the depth of from 25 to 32 fathoms (190 feet). Now as light, according to the experiment of Bouguer, after traversing 180 feet, is weakened in the proportion of 1 to 1477·8 this fucus must have been illuminated when growing by a power 203 times less than that of a candle at a foot distance. Are we to suppose that this feeble degree of illumination was sufficient to decompose the carbonic acid of such a plant, or was not the decomposition rather owing to the operation of some unknown cause?—*Dr. Lindley's Botany.*

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THE

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THEORY OF THE EARTH.

In several former numbers of our Journal were inserted letters from Mr. Cavalier and Mr. Utting, relative to the theory of the formation of the earth; and we promised, when terminating that correspondence, to give our own opinions on some of the points discussed. It will, however, most probably be more acceptable to those of our readers who have not attended to this branch of science, if we present them with a statement of facts, rather than a bare enunciation of opinions. We propose, therefore, to describe, in the first place, the appearances which the crust of the globe presents, so far as man has been enabled to penetrate.

The whole depth of strata that have been submitted to examination, taking into account the elevation of the highest mountains and the sinking of the deepest mines, does not amount to eight miles; which extent, compared with the diameter of the globe, has been not inaptly compared to the proportion which the coat of varnish on a terrestrial globe bears to its dimensions. It will be seen, therefore, that positive human knowledge of the formation and contents of the mass of the earth, must necessarily be extremely limited. The range of strata exposed to investigation, however, presents many extraordinary appearances that throw considerable light on the order of their formation; and the constitution of the external crust of the globe must always be the most interesting subject of investigation to man.

The rock which is supposed to constitute the foundation whereon all the other strata that we are acquainted with rests, is granite. This rock is not a simple substance. It is composed of quartz, feldspar, and mica; and these again, or at least the two latter, are compounds, in which silex, alumine, lime, potash, and other substances are mingled in various proportions. These elementary substances are crystallised in granite; the crystallisation and the composition of the rock indicating that it has been in a state of fusion, and gradually cooled. The rocks immediately resting on the granite, are also usually crystalline; their constituents being nearly the same as those of granite, though in different proportions. The peculiarity of these rocks is, that they contain no traces of organic remains. They are, therefore, supposed to have been the rocks formed before any plants or animals were created; or if any organised beings were then in existence, that the traces of them have been lost by the fusion to which the rocks were subjected.

Next above these occur strata that contain the fossil remains of the lowest order of marine animals. These animals must at one time have lived in the sea, and the strata wherein they occur must have been covered with water at the time of their formation, though now to be found on some of the highest mountains.

The secondary rocks, which lie above the transition strata, contain the remains of marine animals of more complicated organisations; and the *upper* secondary strata contain fossil remains of land reptiles of immense size, different from any which now exist. In these strata, also, are found the traces of plants.

In the tertiary strata, which lie above the secondary, there are discovered animal remains of still more perfect or advanced kinds, including marine, fresh-water, and land. Among the land specimens are the remains of animals much larger than any which now inhabit the earth. Few, indeed, of the genera or species of the animals found imbedded in any of these strata, resemble those which at present exist. The tertiary strata consist of clay, marl, carbonaceous limestone and sandstone. All the regular strata are in most places covered by diluvial and alluvial deposits of gravel, sand, clay, soil, &c.

It is one marked peculiarity observable in the rocks comprising the crust of the globe, that the fossil organic remains in the upper strata are those of more perfectly and complicated organised beings than those in the lower series; and that in none are there found the fossil remains of the human species. We learn from this fact, that man was among the last of created beings; and that since he was placed on the globe there have not occurred any of those great convulsions which have lifted the bed of the ocean to the tops of mountains, nor submerged the inhabitants of the earth to the bottom of the sea.

Though the order of stratification we have mentioned, may be considered the natural order in which the strata have been laid upon one another, it by no means follows that this is the order in which they are always found. It frequently happens that one class of strata is altogether wanting; and instead of lying upon one another as if regularly deposited, they are placed at varied angles, horizontally, perpendicularly, and sometimes in a zig-zag direction. Nevertheless, the general order is always observed so far, that secondary strata are never found lying beneath the primary rocks, nor the tertiary strata on those of the secondary. There are no indications, in short, that the order of progression in the original formation of the crust of the globe has been reversed.

There is, however, an exception to this rule in the unconformable trap or basaltic masses which are found covering all the regular successions of strata. Numerous instances occur wherein the subjacent strata, which dip at a considerable angle to the horizon, are covered over, or capped, by masses of trap or porphyry, or other rock having all the characters of primitive rocks. But in most of these cases the cause of this superposition can be readily traced. These masses have been ejected from below the regular strata in a melted state, like the lava from a volcano, and have been deposited in the places where now found long after the succession of strata has been formed. In most mining districts, the evidence of these eruptions of melted matter are too frequent for the miners, and often baffle their best-founded calculations. The melted rock in forcing its way upwards displaces the regular strata, and fills up the rent it makes with a substance altogether foreign to the ordinary succession of stratification. The appearances these "faults," as they are termed, present, are unequivocally demonstrative that they have been thrown up in a state of fusion, after the strata have been formed. They may be considered, therefore, merely as the effects of the eruptions of mighty *volcanoes*, which have covered, in some instances, immense tracts of land with their melted lava, and have no relation to the formation of the general stratification.

We come now to consider, and we must do so very briefly, the causes that could have operated to make what was formerly the bed of the sea dry land; to have afterwards submerged it; and again, have elevated it to the tops of the highest mountains. It appears to us that the most rational cause to be assigned for the phenomena is heat. It seems to be generally admitted that the earth was originally a fluid mass, and it is more in accordance with natural appearances that its fluidity was caused

by heat, than by solution. The water which is now on the surface of the earth must then have existed as aqueous vapor, surrounding the melted globe. These vapors would condense as the surface cooled, and settle in the concavities, forming lakes and oceans. It would appear that these waters were the first recipients of created life; and that the deposits of innumerable years formed the substance of the first transition strata, which, we must conclude, were afterwards lifted up from the bed of the ocean. A series of years beyond human calculation, and the influence of more powerful agents than at present operate in nature, might decompose the primary rocks, and form subsequent deposits, aided by vegetable organisation; these again might be submerged in the waters, to be again in the course of time uplifted.

In all theories of the earth we must assume the existence of agencies the nearest approaching to those we now see in operation, and in the absence of positive data the best theory is that which with the assumed agencies will afford the best explanation of the phenomena we behold. It is undeniable that those parts of the earth's surface wherein strata of marine products are succeeded by strata containing remains of vegetable organisation and of land animals, and the latter are again covered by strata of marine formations, must have been under the water at successive and distant periods. Now experience tells us, even at the present day, that the agency of heat is sufficient to raise islands from the sea, to depress land under water, and to cover the surface with melted masses of rock: though these operations have been conducted on a smaller scale. It is reasonable therefore to conclude that heat was the chief agent in producing the changes of position in the different strata on the surface of the earth. It does not follow, as a necessary consequence that we must infer the existence of central heat, though there is nothing irrational in such a supposition, and it is countenanced by many well-established facts. The heat may be assumed to be brought into operation by the chemical development of electricity, without supposing that the centre of the earth is in a state of fusion. The mode of its development is however a minor consideration. That heat was the agent, and that its agency is sufficient to produce the phenomena exhibited, is the chief point to be determined, and of this we think but little doubt can be entertained.

IMPROVEMENTS IN MANUFACTURING BEET-ROOT SUGAR.

The quantity of sugar extracted from beet-root in the commencement of the process, amounted only to two per cent; but it was afterwards made to yield five per cent.; and it was supposed possible to extract 6 per cent. On this calculation, the fiscal regulations for the protection of colonial sugars in France were founded; but recent experiments have been made, by means of which as much as ten and a half per cent. of sugar has been obtained. The following notice of the improved process is given in a recent number of the *Constitutionnel*:—

"It appears that a great improvement is likely to be made in the manufacture of beet-root sugar. Those who are acquainted with the process of this manufacture, are aware that M. de Dombaslo has the last six years exclusively devoted himself to bring to perfection the process of maceration, of which he is the inventor. Adopting recent improvements, this process is materially altered, and has now arrived at such a point of perfection that it could scarcely be exceeded. The society for the encouragement of national industry, in November last, appointed committees to examine the effect produced in the manufactory of Roville. They witnessed the entire progress of the work, every part of which was subjected to minute investigation. Similar experiments have been made in the presence of many distinguished manufacturers.

"We have not the least intention to prejudge the decision which may be made on this subject by the society we have alluded to; but we believe we are able to mention the principal results that have regularly attended the works of the manufactory this year. The produce in coarse sugar has been more than eight per cent. of the first quality, and more than two per cent. of the second quality, in all nearly ten and a half per cent. of the weight of the beet-root used; and the quality of these sugars has been considered by all the manufacturers superior to anything of the kind that has hitherto been made, and admits of its being converted into loaf-sugar of the first quality. The progress of these operations is as simple as possible, and the expenses attending the manufacture are considerably less than that of the process hitherto adopted."

BRITISH PATENTS.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 84.)

THOMAS BARNABAS DAFT, of Birmingham, Warwick, gent., for *improvements in inkstands or inkholders*, Feb. 1.—This invention relates, First—To a mode of working the instrument which causes the ink, when required for use, to flow out of its natural level up into the inkholder, which is situated above the general level of the ink, and whereby the act of raising the cover of the inkholder is the means of causing the required supply of ink to be forced up into the inkholder, and the closing of the cover of the inkholder will allow the ink in it to descend into the inkstand, and any quantity of ink which may have been used will be replaced by air passing through the ink contained in the inkstand.

Secondly,—To a mode of constructing the instrument by which the ink is caused to ascend from its general level in the inkstand into the inkholder placed above the level of the ink in the inkstand.

Thirdly,—To a mode of applying the tube or passage for ink, by passing through the piston or plunger of the inkstand.

Claim first.—The inkholder is placed on the top of the inkstand, and is in shape similar to a funnel with a long tube, which reaches nearly to the bottom of the inkstand, and the end is covered with a piece of fine wire cloth to act as a sort of filter. On the top of the inkstand likewise is placed a small air-pump, which communicates with the interior of the inkstand by a bent tube, the end of which comes nearly in contact with the top of the inkstand, in order to prevent any of the ink from entering it in case the inkstand should be tilted over. The cover of the inkholder is provided at the back of it with a lever, which is connected by a pin-joint or otherwise with the piston-rod of the air-pump, so that on the cover of the inkholder being lifted up it will force down the piston of the air-pump, and the air entering the inkstand will cause a quantity of ink to rise up into the inkholder ready for use. On the cover of the inkholder being closed it will draw up the piston of the air-pump, and by this means a portion of the air being withdrawn the ink will descend into the inkstand to occupy its place. The space occasioned by the use of the ink is filled up by the air which rushes into the inkstand.

Claim second.—The mode of raising the ink into an inkholder placed above the level of the ink in the inkstand, by applying a flexible material as herein described.

The bent tube is removed, and a piece of india rubber or other flexible material is fastened round the bottom of the barrel of the air-pump, and the centre of this flexible material is attached to the piston, so that on the descent of the piston the flexible material is forced down into the inkstand, compressing the air contained therein, which forces the ink up into the inkholder. On the piston being raised the flexible material is drawn a little way up the barrel of the air-pump, and the ink descends into the inkstand.

Claim third.—The mode of making the inkstand or inkholder, wherein the ink is caused to rise above its level, in order to offer a supply for use by placing the tube or ink passage of the inkholder in the piston or plunger as herein described.

The tube of the inkholder is placed in the cover of the inkstand, which is composed of cork or any other suitable material, and which cover slides up and down in the neck or mouth of the inkstand. When ink is required for use the cover is pushed down, and the ink ascends the tube into the inkholder; on drawing it up the ink descends into the inkstand.

WILLIAM DAUBNEY HOLMES, of Lambeth-square, Surrey, civil engineer, for *certain improvements in steam-engines, and in generating and applying steam as a motive power*, Feb. 1.—Claim first.—The application of an intermediate chamber to increase the heat and pressure of steam previous to its acting in the cylinder of the engine. The steam passes from a low pressure boiler into one or more intermediate chambers, where the pressure is raised by the application of heat to the chambers. The steam is admitted alternately into the cylinder from the three chambers, and each chamber is alternately refilled with low pressure steam, the temperature of which is raised as above mentioned.

Claim second.—The effecting the same object by heating the cylinder externally; but the patentee excepts from this claim the ordinary locomotive boiler, which is heated externally by being placed in the smoke-box. A chamber is formed between the cylinder and its jacket, and is filled with oil or any other liquid that boils at a high temperature; and the patentee states that by this means a greater degree of heat is retained in the cylinder, and the steam is kept at a high pressure.

Claim third.—The conveying water into a steam-boiler by the circulation of steam and water through pipes, cocks, and valves, connected with an intermediate chamber.

From the tank the water runs through pipes into an intermediate chamber or tank, and thence by pipes into the boiler. When the boiler is in want of water, the valves of the pipes between that and the intermediate tank are opened, and the steam rushes in, and fills the tank; then the above mentioned valves are closed, and those communicating with the water tank are opened, and the water fills the intermediate tank, and condenses the steam therein contained. The last-mentioned valves are now closed, and the first-named ones are opened, when the water runs through the lowest pipe into the boiler, as the steam is entering the intermediate chamber through the upper pipe, and so on alternately.

Claim fourth.—The charging or supplying steam from a low pressure to a high pressure boiler, as herein described.

The steam from the low pressure boiler is admitted through pipes into an intermediate chamber, and the valves of those pipes are closed. Then the valves of those pipes that communicate between the intermediate chamber and the high pressure boiler are opened, and the low pressure steam descends into the boiler, and the intermediate chamber is filled with high pressure steam, so that a supply of high pressure steam is constantly kept for the cylinder.

Claim fifth.—The conveying of waste steam at a high temperature into a low pressure boiler, to increase the temperature of the steam or water in the boiler.

The waste steam from the cylinder passes into a pipe, which enters the low pressure boiler at the bottom, and extends to the top of the boiler, where the steam may be let out into the boiler or into the condenser.

Claim sixth.—The application of steam through the medium of a drum to a rope, chain, band, &c., laid along railways or other roads and canals, for the propelling and hauling carriages and vessels thereon. A rope is laid along the railway, and is fastened or held at each end of the line of railway and at intermediate places by holdfasts. It is also passed two or three times round a drum supported on a carriage before the locomotive engine is attached. This drum is connected with a crank worked by rods from the locomotive, and the drum being turned round, the adhesion or friction of the rope will cause the drum to follow the line of the rope, and drag the carriages that may be attached to it. There are weights suspended from the rope at different parts of its length over wells, so as to keep the rope tight, and yet to supply an extra quantity of rope for coiling on the drum when required.

On canals the rope is fastened at each end, and at intermediate parts of its length, the same as on railways, and is supported by rests placed on piles driven into the bed of the canal, which piles are also provided with friction rollers to guide the canal boats.

The engine is placed in a canal boat, and is connected by rods with the crank of the drum, round which the rope is coiled once or twice, and the drum being turned propels the canal boat containing the engine, and the boats that are attached.

JAMES TAAFFE, of Shaw-street, Dublin, slater and builder, for *improvements in roofing and slating houses and other buildings*, Feb. 1.—Claim.—The mode of roofing and slating houses and buildings as herein described.

A water-course is ploughed out in each rafter, and lined with lead, zinc, or any other material to prevent the water from injuring the wood. The lower course of slates is now laid, the edges of the slates meeting over the water-courses in place of overlapping one another, as usual, and the lower as well as the upper parts of this course are firmly screwed to the rafters. The upper courses of slates are now laid in succession, their lower edges slightly overlapping the upper edges of the lower course, and they are secured at the lower edges by clamps passing through both courses, and at their upper edges by being firmly screwed to the rafters.

FELIX TROUBAT, of Mark-lane, London, merchant, for *improvements in the manufacture of vinegar*, (communicated by a foreigner residing abroad,) Feb. 1.—Claim first.—The mode of making vinegar by the application of potatoes as herein described.

The patentee takes 350 lbs. of potatoes in their raw state, and has them well rasped or gratered. To these are added 20 to 25 gallons of water, and 2 lbs. of sulphuric acid, and the whole mixed together and boiled for six hours. The mixture is then run off into a vessel to cool, through a perforated plate at the upper part of the vessel, in order to free the liquor from any sediment. It is then poured into another vessel placed in a chamber heated to about eighty degrees Fahrenheit. Half a bushel of yeast and one ounce of potash, previously dissolved in water, are then added to this mixture, and it is allowed to stand for three days. Then another quantity of yeast is added to increase the fermentation. After it has stood for some time it is drained off into another vessel, filled loosely with shavings of beech or the husks or skins of grapes (after they have been pressed) saturated with strong vinegar. Three gallons of liquor are added morning and evening until the vessel is full. It is then drawn off, three gallons at a time, at the bottom of the vessel by a cock, and carried to another vessel half filled with vinegar, which completes the process. It is drawn off from the centre of this vessel by a cock into another vessel, loosely filled with shavings of beech, in order to cool and clear it before it is fit for consumption.

Claim second.—The mode of making vinegar by the application of rice as herein described.

To 50 or 60 lbs. of the meal of rice, previously prepared by crushing, is added the same quantity of water and sulphuric acid, as above mentioned, and it is then submitted to the process previously explained.

This is also the case when making it from potatoes that have been previously deprived of their skins.

Another mode is as follows:—To 350 lbs. of potatoes that have been well crushed and washed in cold water add 50 gallons of boiling water. Let this liquid stand till it assumes the consistence of a thick paste. Then add half a bushel of meal of malt, which brings it into a saccharine state. It is next submitted to the previously-described process for obtaining the requisite fermentation.

In operating upon rice by this mode the same proportions may be used.

The patentee does not confine himself to the exact proportions above-mentioned.

JAMES HODSON, of Liverpool, Lancaster, engineer, for *a new mode of combining and applying machinery for the purpose of cutting or planing wood so as to produce plain or moulded surfaces*, Feb. 3.—The patentee does not claim any of the parts separately, but he claims the mode of combining and applying machinery, whereby he is enabled to employ a spiral rotary cutter for the purpose of cutting and planing wood, so as to produce plain or moulded turfaces.

The wood is secured by screws to a wooden table, which is fastened upon an iron frame, this frame moves slowly along beneath a revolving spiral cutter, by which the wood is planed, and as soon as nearly the whole length of the frame has passed under the spiral cutter it returns with an instantaneous movement.

The spiral cutter is a twisted bar of steel, or of iron with a steel edge, and turns on centres in the standards of the framing. The cutting edge is formed at only one edge of the plate or bar of which the spiral cutter is composed, and the cutting edge proceeds from one end to the other in a spiral direction around its axis of motion, and in this particular it differs materially from the rotary cutters now in use, which have their cutting edges straight. When moulded edges are required to be produced, the spiral cutter is made with such indentations as will cut the desired mouldings; and in order to form the proper figure or cutting edge to the spiral cutter a steel tool of the figure of each intended moulding is affixed under the spiral cutter, and the spiral cutter is made to revolve, and thus its edge is cut away to the figure desired, the tool being progressively advanced as the indent is produced.

When the proper figure is obtained the edge of the indent is brought to a sufficient degree of sharpness by means of a file applied in the usual way.

In using the said cutter for mouldings there may be many mouldings produced at once, or part of the cutting edge may be working to produce mouldings, and the other part plain surfaces.

JOHN SANDERS and WILLIAM WILLIAMS, of Bedford, iron-founders, and SAMUEL LAWRENCE TAYLOR, of Old Warden, Bedfordshire, machine-maker, for *improvements in ploughs*, Feb. 3.—Claim first.—The modes herein described of applying coulters to ploughs, so that by means of clamps and screws the distance of the coulter from the beam, and also the angular positions of the coulter, can be regulated.

The coulter is applied to the beam of a plough by means of a frame which moves on an axis or bolt passing through the beam; and the coulter may be adjusted to any angle by a set screw passing through a fixed nut on the beam of the plough. Or the coulter may be applied to the beam of a plough by means of a sliding socket, having a set screw by which it can be made fast at any desired part of the plough-beam; and the coulter is made fast to a projecting angular-faced plate by means of a clamp, which clamp consists of a plate bent at right angles at top aud bottom, and having two recesses formed therein. It also has two set screws, which have each an eye to receive the stem of the coulter, and by means of their screw nuts draw the stem of the coulter against the angular face of the plate, and, according as the upper and lower nuts are screwed up more or less tight, so will be the position of the coulter more or less approaching to a vertical position. The distance of the coulter from the beam will be regulated by the position it is fixed at on the angular plate.

Claim second.—The mode of applying a coulter as herein described, whereby the coulter is caused to stand off at any angle from the plough-beam by means of set screws and a sliding plate.

The coulter is fastened to the plough-beam in any required position, by means of a clamp and set screw, and it is caused to stand off at any angle from the beam by a sliding plate and set screws.

WM. BEETSON of Brick-lane, Old-street, St. Luke's, Middlesex, brass-founder, for *improvements in water-closets and stuffing-boxes, applicable to pumps and cocks*, Feb. 5.—Claim first.—The mode of applying valve-seats and valves to water-closets, whereby the valves are in an inclined position when closed as herein described.

The valve is similar to ordinary valves for water-closets, but the valve-seat in place of being horizontal is formed in an angular position, so that when the valve is closed it also stands at an angle. By pulling up the handle the valve is not only brought to a vertical position, but is partly raised towards the back of the water-closet, so that no soil or paper can adhere to the valve.

To the bottom of the overflow-pipe the patentee applies a valve, which has at all times a tendency to remain closed, and is only opened when there is a pressure of overflow-water. By this means no effluvia can pass from below up into the basin.

Claim second.—The mode of applying flexible cups to close the openings through which the lower handles of pumps and cocks pass, in order to form stuffing-boxes thereto, as herein described.

A flexible cup (which the patentee prefers to be of leather) is screwed fluid tight all round the opening through which the handle of the pump or cock works, and the centre of the cup is screwed on to the handle which passes through it, so as to form a fluid-tight stuffing-box, which is applicable to pumps and all cocks having slide valves.

COLIN MACRAE, of Cornhill, Perth, Scotland, gent., for *improvements in rotary engines worked by steam, smoke, gases, or heated air, and in the mode of applying such engines to useful purposes*, Feb. 5.—Claim first.—The improvements in Degrand's rotary engine, which consists in giving to the curled pipes of the two wheels contrary directions of spiral convolutions, each wheel being contained within a distinct compartment, one of which is kept in a state of "plenum of elastic fluid," and the other in a state of exhaustion. The engine being capable of being worked either backward or forwards at pleasure, and either with or without a condenser, and by steam, smoke, gases, &c.

Claim second.—The improvement of combining together two or more of such rotary engines as herein described.

The revolving part of this rotary engine consists of two wheels formed of circularly and spirally curled pipes, placed side by side on a horizontal axis common to both wheels, but the direction in which the spiral of one of the wheels curls is reversed with respect to the other. Both wheels are enclosed in a box or case, the interior capacity of which is divided into two compartments by a vertical partition, one of the wheels being in one compartment, and the other one in the other end; the wheels are connected together by a large hollow axis passing through the partition that divides the compartments, which are each an air-tight vessel. The lower part of the box contains mercury or fluid metal, which passes from one compartment to the other through an opening in the partition, which is always immersed in the liquid metal, and the circumference of the wheels dips into and revolve in the said metal. Each curled pipe is open at both ends, the outer open end of each dipping

into the liquid metal as they revolve; the other end opens into the interior of the hollow axis. The steam, gas, &c., by which the engine is to be impelled is constantly supplied into one of the compartments, so as to constitute a "plenum of elastic fluids," while the other compartment, which has an open communication with the atmosphere, is kept in a state of exhaustion or partial vacuum.

The rotary motion of the two wheels is produced by the mercury being forced by the steam, &c., to rise up in the manner of a barometric column within the hollow of the curled pipe, so as to produce a constant load at one side of each wheel, tending to turn them both round in one direction. The mercury enters the outer end of the curled pipe in the plenum compartment, and is forced by the steam to mount up therein, whereby it loads one side of the wheel, causes it to turn round, and by the revolving of the wheel the mercury is conducted through the curled pipe into the interior of the hollow axis. It there enters into the curled pipe, and following it, curling, is let out into the other compartment.

Claim third.—The improvement whereby a rotary engine similar to that above described is rendered capable of operating with the full effect due to an elastic fluid of much stronger elastic force, because the barometric columns of the mercury or liquid metal used in the machine are much higher than the diameter of the wheels of the rotary engine.

The mercury, after passing through the two wheels is driven by the steam which mixes with it, up to the top of a high pipe, whence it descends by another pipe into the plenum compartment, by which means a greater degree of power is obtained for turning the wheels round.

Claim fourth.—The improvement herein described, whereby a revolving wheel formed of a curled pipe is placed in a horizontal position, with its hollow axis in a vertical position, the wheel being at the lower part of the axis, and immersed in the liquid metal contained in the box wherein the wheel is enclosed. By a suitable action of the steam, &c., a portion of the liquid metal is caused to mount up into an upper reservoir, from whence it enters into the upper end of the hollow axis of the wheel, and by descending therein to the interior central hollow of the wheel it acts with a continual columnar pressure within the curled pipe of the wheel, so as to cause a continuous rotary motion thereof and of its axis. The liquid metal which has passed through the said curled pipe, and has escaped from the open end thereof into the box wherein the wheel is contained, is then forced, by suitable action of steam, &c., to mount up again into the upper reservoir, in order to repeat its said action over and over again. This fourth improvement is perfectly described by the above claim.

Claim fifth.—The improvement herein described of applying two or more rotary engines, when combined together in a series, to the purpose of locomotive engines, either on railway and other roads, or for propelling vessels on water, and other useful purposes. To the horizontal axis first mentioned, to which the curled pipes are attached, and which passes through the hollow axis, is fastened the driving wheels of the locomotive engine, and the curled pipes, revolving, propel the same. In applying it to steam-boats or other vessels the paddle wheels are fastened to the end of the horizontal axis.

Claim sixth.—The improvement herein described of protecting the upper surface of the fire-bars with earthy matter which will resist fire.

Each fire-bar is formed with an open groove along its whole length, which is rammed full of earthy matter that will stand fire. The bars are then subjected to fire in order to burn the earthy matter into pottery, which will be held in the groove by the roughness of the metal. The cracks are filled with fine fire clay, and then covered with suitable pottery glaze that will strongly resist the fire.

Claim seventh.—The improvement herein described of giving an agitating motion to every alternate fire-bar, in order to stir the fire which is burning thereon.

One end of every alternate fire-bar is moveable upwards on a centre of motion at the other end, the other bars being firmly fixed as usual. When the fire wants stirring the moveable bars are raised by small levers (one under each bar), fastened on a horizontal axis, which is turned by a handle.

Claim eighth.—The improvement herein described of applying tar, or coal tar or other liquid, as fuel to produce combustion within a close furnace.

A flat shallow vessel filled with coal tar occupies the place of the fire-grate in a close furnace, and several small pipes (the upper surface of which are perforated with small holes) are extended across the vessel (near the bottom) and through the side of the furnace. A stream of compressed air is forced through these pipes into the vessel; and on a light being applied to the tar above the holes in the pipes, the same will burn in jets of flame at those parts, the combustion being supported by the compressed air.

Henry Trewhitt, Esq., of Newcastle-upon-Tyne, for *improvements in applying the power of steam-engines to paddle-shafts used in propelling vessels*, (communicated by a foreigner,) Feb. 7.—The patentee lays no claim to any of the parts separately; but he claims the mode, herein described, of applying the crank pins to paddle-shafts.

This invention relates to a mode of applying the crank pins of paddle-shafts in such a manner that either of the paddle-wheels may be disconnected from the engine, and again connected with great facility.

On each of the paddle-shafts is affixed a narrow cylinder, which has a groove formed on its periphery, lined with copper, to receive a strap, to which the crank pin that drives the paddle-shaft is attached; the other end of the crank pin is keyed into the crank of the middle shaft. In order to connect the paddle-wheel to the engine, the strap is caused to bind tightly on the narrow cylinder; and to disconnect it the strap is loosened.

The mode of tightening and relieving the strap is as follows:—A cross-head passes through slits in the ends of the strap, and to this cross-head is fastened a cushion, which rests on the narrow cylinder, its under surface being curved so as to fit it.

When it is desired to connect the paddle-shaft to the engine, the cushion is caused to press on the cylinder by a wedge-like bar, which enters between the back of the cushion and the cross-head, and by this means the strap is caused to bind tightly on the cylinder, and so connect the paddle-shaft. On loosening the strap, by removing the wedge-like bar, the paddle-shaft is disconnected.

Robert Stirling Newall, of Dundee, Forfarshire, Scotland, for *certain improvements in wire ropes, and in machinery for making such ropes*, Feb. 7.—Claim first.—The method of making wire ropes, whereby the individual wires are prevented from being twisted in themselves.

Claim second.—The method of making wire ropes, by "laying" wires round a core to form a strand, and by "laying" strands round a core to form a rope, when the number of wires or strands exceeds three, whereby the wires forming the strands, and the strands forming the rope, are kept at equal distances from their centres.

Claim third.—The laying the wire into strands, and the strands into ropes, at one and the same time.

The rope is composed of six strands surrounding a core, each strand being composed of six wires surrounding a core.

From the main shaft of the machine there extend six arms, with bearings in the end of them for the six bobbin frame shafts, the other ends of which shafts revolve in bearings in the ends of six other shorter arms, attached to the same axis; so that the bobbin frame shafts incline towards the other end of the main shaft where the rope is formed. From the bobbin frame shafts there extend six arms, with bearings in the ends of them for the six bobbins which carry the wire. The core is on a seventh bobbin, carried in the framing of the bobbin frame shaft. The wires and cores are conducted to the other end of the main shaft through perforated plates, so as to keep each one separate; but the core of the rope passes through the main shaft. A revolving motion is communicated to the main shaft, and a contrary revolving motion to the bobbins, by which means the rope is made, the strands being formed just before they reach the main shaft where the rope is formed.

Claim fourth.—The method of joining two ropes, and of attaching a hook or eye, or other fastenings, to the end of the rope.

The end of the rope is passed through a conical thimble, and the ends of the strands doubled in; the rope is then pulled back till the doubled-in part fits the thimble. Melted brass is then poured amongst the ends of the strands, which will prevent their being drawn out of the thimble. The end of the other rope is treated in the same manner, and both thimbles are screwed together by means of a right and left hand screw, and fastened by pins to prevent their unscrewing. A hook or eye is fastened to the end of a rope by a thimble, in a similar manner. In order to keep the ropes from decay, they are coated with a mixture of six parts tar, two parts linseed oil, and one part tallow, melted and mixed together, and applied while hot to the rope.

Andrew Smith, of Princes-street, Leicester-square, and of Mill Walk, Poplar, Middlesex, engineer, for *certain improvements in carriage wheels, rails, and chairs for railways*, Feb. 7.—Claim first.—The right-angled grooves in the tires of the wheels of railway carriages, instead of an external flange. The tire of the wheel is made of wrought iron, with a right-angled groove turned out in the middle, which is designed to fit and run upon the rail herein-after described. The depth of the groove is to be in relative proportion to the size of the rail. The groove forms a flange within the surface of the tire, and is designed to keep the wheel on the rail.

Claim second.—The adaptation of common square bar iron, or of iron made in a square form, let into a wooden sleeper.

The rails are made of the common square bar iron, or of square bar iron formed and manufactured of the size required. The sides of the square of the rail are about one-third more in width than the depth of the sides of the groove in the wheel tire, which prevents the wheel from coming in contact with the chairs and sleepers. The rail is laid in a groove cut in the sleeper, which is of wood, and when so laid it presents one of the angles of the square upwards, corresponding with the groove in the tire of the wheel, and upon which the wheel runs.

Claim third.—The chair, for connecting, and fixing, and fastening the rails on railways.

The chair for connecting the separate and continuing rails is made of wrought or cast-iron, and clips the sides of the rails in a dovetail form, and is let into and bolted down to the wooden sleeper. One of these chairs is placed at the junction of the separate and continuing rails, which are twelve feet long, by two inches and a quarter square; and one of the chairs in the middle of the rail, besides those at the junction of the two rails, is found sufficient to attach and keep the rails to the sleepers. The patentee does not confine the proportions of the rail to the above, as they may be varied according to circumstances.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page* 84.)

George Edward Noone, of High Holborn, Middlesex, engineer, for *improvements in pumps and in engines for drawing beer, cider, and other fluids*, Feb. 3.—This invention of improvements in pumps and in engines for drawing beer, cider, and other fluids consists:

First,—In the application of a semi-rotary stuff-

ing-box to pumps, or machines or engines used for such purposes.

Secondly,—In a kind of flexible joint to be substituted for stuffing-boxes to such pumps or machines.

Thirdly,—In a peculiar application of flexible materials to answer the purpose of a stuffing-box when rectilinear motion is used.

Fourthly,—In a mode of covering the lower part of the pump (or beer or other engine) by which access to the lower valve may be readily obtained in case of need.

Fifthly,—In a mode of regulating the rectilinear action of the piston-rod, with a guide for such purpose, capable of easy adjustment.

The patentee claims as his invention the principles set out in the preceding five claims, but he does not confine himself to the precise form and arrangement therein shown.

The handle of this pump is attached to one side of a semi-rotary stuffing-box, from the other side of which there extends a lever, which is connected by a slug with the piston-rod of the pump. The rectilinear motion of the piston-rod is regulated by an easy adjustible guide. This guide consists of a ring formed conically, so as to drop into its place in the pump barrel, and has a kind of bridge formed across it through which the piston-rod works.

The flexible joint is composed of a piece of some flexible material, which is fastened at its centre to the end of the lever that works the piston-rod, and is fixed round its edge into the side of the pump-barrel above and below the semi-rotary stuffing box.

Another application of the flexible material to answer the purpose of a stuffing-box, when rectilinear motion is used, is as follows:—In the upper part of the pump-barrel a plate is fastened, to which is fixed one end of the flexible material, the other end being attached to the hollow piston-rod, which on receiving an up and-down motion stretches the flexible material, or compresses it. The lower cap of the pump is secured by a flange, by unscrewing which the cap may be slidden up the pump-barrel, thus affording a facility for getting at the lower valve if required.

William Saunders, of China-terrace, Lambeth, Surrey, chemist, *improvements in paving streets, roads, and ways*, Feb. 3.—Claim first.—The formation of a compound block for paving streets, roads, and ways, consisting of three distinct blocks; the centre one of which is equal in solid contents to the two side ones; the sides of which slope to the angle herein shown.

This compound block is composed of three distinct blocks, fastened or attached together by pins or tree-nails; the centre block slanting in one direction, and the side blocks in the other direction. The centre block is equal in thickness to both the side blocks put together, and carries the pins, bolts, or tree-nails, the ends of which are inserted into holes made in the side blocks for that purpose.

Claim second.—The methods herein described of combining a number of the said compound blocks to form a compact and solid pavement, such blocks, when so combined, supporting and being supported by each other.

The blocks may be laid straight with the line of the road, or angularly or diagonally across the road; or they may be laid in such a manner that the centre blocks shall rest upon the side blocks of the adjacent blocks, and those side blocks in return rest upon the centre blocks of the adjacent blocks.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page* 84.)

Theophilus Richards, of Birmingham, merchant, for *certain improvements in cutting or sawing wood*, (communicated by a foreigner), Feb. 5.—This invention of improvements in cutting or sawing wood, consists in the application of a peculiar construction of machinery, particularly applicable to cutting veneers or thin slices from a block of wood.

The wood is fastened in a vertical position to an upright frame; which is moved up and down by a rack and pinion, and can be moved to or from the saw, in order to regulate the thickness of the veneer.

The saw is worked as a circular plate, presenting a perfectly plane surface on its front side; but its back part is bevelled or wedge-shaped, in order to throw off the veneer when cut, and there is a thin plate of metal placed behind the saw, to conduct the veneer away. The saw is placed in a sliding frame at the bottom of the wood to be cut, and a revolving motion is communicated to it: at the same time its frame advances, till the saw has passed through the wood; the frame then recedes with the saw, and the wood is lowered a distance equal to the depth of the cut; the saw then advances as before.

PATENT LAW CASE.

Infringement of a Patent.—In the Court of Common Pleas, on Thursday, an action for infringement of patent rights was tried, in which Mr. Watson was the plaintiff, and Messrs. Potter and Co., defendants. The patent on which this action was brought was obtained by the plaintiff on the 27th of March, 1834. The subject-matter of that patent was described in the specification to be "a certain improvement in cards for carding wool, cotton, silk, and other fibrous substances, and for raising the pile on cloth;" and that improvement was stated to consist "in the application and adaptation of caoutchouc or India-rubber, as a substitute for the fillets or sheets of leather used in the construction of ordinary cards." The mode of using the caoutchouc pointed out by the plaintiff's specification was, to cement a strip of brown Holland to the back of the caoutchouc, and to fix the cloth so cemented to the cylinder, the object of cementing the cloth to the India-rubber being to preserve the regularity of the distance between the teeth of the card; and the specification recommended the use of layers of India-rubber, cut from the blocks as imported, in preference to those that are prepared. The defendants had pleaded, in answer to this action; 1st, not guilty, which denied the infringement of the patent; 2dly, that the plaintiff was not the first and true inventor; 3dly, that the subject-matter of the patent was generally known and used in England before the grant of the patent; 4thly, that certain parts of the invention were useless; 5thly, that the specification did not with sufficient particularity describe the invention; and, 6thly, the leave and licence of the plaintiff. It appeared that in 1837 the defendants, for the first time, purchased some of the cards made according to the plaintiff's specification. Shortly afterwards one of them began to make experiments at their manufactory, and in April, 1839, a patent was granted to the defendants "for certain improvement or improvements in cards for carding fibrous substances." The specification to that patent stated the invention to consist, 1st, in the preparation of a peculiar cloth, and, 2dly, in passing that cloth through a solution of India-rubber, known as India-rubber varnish or cement; and one of the principal questions in the cause was, whether the patent obtained by the defendants was valid, or whether their alleged improvement was anything but a specious imitation of the plaintiff's invention. That question arose upon the first plea; but upon the second and third pleas the plaintiff's invention was put in comparison with a previous invention of Mr. Hancock, who obtained a patent in 1825 "for a new and improved manufacture, which may in many cases be used instead of leather." Hancock's invention, according to his specification, consisted in filling, saturating, and combining various fibrous substances with certain compounds, of which caoutchouc formed the main ingredient, so as to consolidate them into one mass; and the defendants alleged that the plaintiff's was merely a copy, with unimportant variations, of Hancock's invention. The question, therefore, upon these pleas also was, whether there was any real and substantial difference between the second; evidence from Scotland, and from the north and west of England, was produced on the part of the plaintiff to show that persons well acquainted with the trade in those parts had never heard of cards being made except with leather before the plaintiff's patent; on the other side Mr. Fayrie and other scientific persons stated that in principle the second inventions were the same, but Mr. Hancock himself considered them distinct. There was no evidence at all upon the plea of leave and licence.

The Lord Chief Justice, in leaving the case to the jury, told them that it would be necessary for them to see whether the defendants' alleged invention was anything more than a specious imitation of the previous invention, for which the plaintiff had taken out his patent. The learned judge left the question with regard to Hancock's patent in the same way, and desired them also to take into their consideration the question as to the sufficiency of the specification, and the utility of the parts of the invention which were objected to as useless; but with regard to the plea of leave and licence, he directed them to find a verdict for the plaintiff.

The jury retired at a few minutes after eight, and came into court at twenty minutes after nine, with a verdict for the plaintiff on all the counts.

COPYRIGHT OF PATTERNS.

In the House of Commons, on Tuesday, Mr. Emerson Tennent brought forward a motion for extending the copyright of designs on printed calicoes and muslins. The following is an abstract of the debate on this important subject:—

In introducing this subject to the house, Mr. Tennent observed upon the more ample protection which the French manufacturers obtained from the law than was granted those of England. The manufacturer in France might have copyright for a term of one, three, five, or ten years, or in perpetuity, on payment of a certain fine. This liberal system had placed French manufactures at the head of all the manufactures of Europe. Such was their beauty that they could obtain a price nearly double that which was given for English goods of the same description. It might be said that the excellence of the French manufactures was not the consequence of that law; but a little consideration would demonstrate the fallacy of this position. In England, instead of a term of 5, 10, or 15 years' copyright, or a copyright in perpetuity, the paltry term of a three months' protection was conceded in 1794. This might have been at that time sufficient, when engraving was performed by the burin, and the impression was all taken by hand. But at the present day, when the electro-magnetic and a variety of other processes were brought most extensively into requisition, the whole system of production was altered. In 1839 Lord Sydenham (then Mr. Poulett Thomson), in reply to an address sent to the Board of Trade, offered to the manufacturers a twelvemonth's copyright for silks and cottons, subject to registry. Those who were engaged in the manufacture of printed calicoes were apprehensive of inconvenience resulting from this arrangement, and at their own entreaty were excepted from its operation. Such was the state of the law at the present moment; it exhibited the utmost incongruity; designs in silk were subject to one law of copyright, and designs in cotton to another. The calico printers came now before the house, and asked for the same law which had been offered to them in 1839; they sought a twelvemonth's protection for cotton as well as silk; and he had yet to discover on what grounds this fair proposition was refused. It was true that a numerous and formidable opposition had been raised against the proposed regulation

but that opposition was almost wholly confined to Manchester. The committee of last year had been occupied for a considerable period in hearing the objections of these gentlemen. The evidence taken by this committee proved that the present law was wholly untenable. It was violated in every direction; as many as 70 or 80 designs of one house had been pirated. The hon. gentleman then quoted the evidence of several of the witnesses examined by the committee: Mr. Brookes admitted that he had himself been a most extensive copyist of other manufacturers' designs. He stated that he copied just as many as answered his purpose—sometimes at a loss, generally with a profit. He usually printed upon cottons of a lower quality; and was occasionally remonstrated with, but never proceeded against. He entered them himself as original designs; and, if proceeded against, avowed that he would have relied on the strength of his purse. Mr. Tennent proceeded to point out the injurious effects the present state of the law has in preventing the production of new and elegant patterns, by which our cotton manufactures might be improved and their sale extended. At present it was not worth the trouble and expense for manufacturers to attend to the elegance of their patterns, for as soon as they are produced, they are liable to be pirated. The quantity of printed calicoes produced by British manufacturers amounted to 15,000,000 yards per annum. Two-thirds of this went in the export trade; and the largest proportion of this went to the East and West Indies. In these cases the copyright must be long expired before the order could be executed. The article of Scotch muslin was a case in point. The principal manufacture of this article was in Glasgow and Paisley. Many of those muslin articles which were worn in ladies' dresses were sent to be worked in the north of Ireland. This muslin had the design marked out upon it in outline. Each piece required four or five weeks to have the pattern completed in work. The designs were during this case quite unprotected, being wrought in the cottages of the country people; and the consequence was, that they were most extensively pirated. Furniture calicoes stood still more in need of protection. Being little subject to fluctuations of fashion, they continue for three, four, and five years in the market. The same observation applied to paper-stainers. It was desired by all, except the latter class of manufacturers, to have the copyright extended from 3 to 12 months. From the proposed extension he anticipated the most beneficial results.

Mr. Mark Philips, the member for Manchester, objected to the proposed extension of copyright; but the ground of his objection, if correctly reported, was most extraordinary. It amounted to this, that by granting an extension of copyright, English patterns would be so much improved, that the French would be induced to copy them, and so send back English patterns for competition in the English market. His words, as reported, are these:—"He agreed that the French produced superior designs to the English; *but if we extended the term of copyright, it would lead to increased expense, and afford an inducement to persons abroad to copy our designs at a cheaper cost, and send the articles here to compete with the originals.* Calico printing had many branches, and there were so many interests involved, that, while we protected one, we could not protect another; he feared, therefore, that much litigation would arise from an alteration of the law as to what was and what was not an original design. The consumer, moreover, was not to be lost sight of, and if the alteration would tend to increase the cost of the manufactured article, he should object to it on that ground."

Mr. Labouchere and other members expressed their concurrence in the principle, that greater protection should be afforded to the designer of original patterns; but they said it would be attended with much difficulty in practice. It was the impression of most of the members who spoke, that six months' term of copyright would be better than twelve, and would afford ample protection to the designer without being injurious to the public. Mr. Serjeant Talfourd vindicated the rights of inventors to their labors; and in reference to his copyright bill, took occasion to observe, that though defeated by an accident, he had not abandoned his original intention The debate ended, by leave being granted to Mr. Tennent to bring in his bill, to extend the copyright of designs on printed muslins and calicoes to twelve months.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

London and Greenwich Railway.—The half-yearly meeting of the proprietors of this company took place at the London Tavern, on Tuesday, William Shadbolt, Esq., in the chair. From the report it appeared that in consequence of a resolution of a former meeting, that a number of new shares should be created for the widening of the viaduct from the London terminus to Corbett's Lane, where this railway joins the Croydon line, at an estimated sum of £200,000, the directors had raised a sufficient sum to enable them to enter into contracts for constructing one mile and a quarter of the viaduct, being three-fourths of the whole, and at a price within the estimate of the company's engineer. The traffic for the last half year showed an increase of 80,284 passengers over that of 1839, and in receipts of £271 15s. 10½d. As the capital raised had placed a considerable sum at the command of the directors, they had employed a portion of it in discharging a loan from the bankers, by which £500 commission had been saved since September. The increase in the year's accounts was £1,858 7s. 8d. over those of 1839, and the nett proceeds to the original shareholders for the year was £7,741 7s. 2d. towards a dividend, which was declared to be 7s. per original share for the year, after which a balance of £752 1s. 2d. remained. The report was adopted unanimously.

Railway Communication with Scotland.—The third report of the commissioners appointed to examine into the best railway routes to the Welsh coast and to Scotland has just been printed by order of the House of Commons. The substance of it has, however, been before public for some time; namely, that the commissioners recommend a line which they call "The Grayrig Line," as, upon the whole, the best between Lancaster and Carlisle. The line north of Carlisle has not yet been determined on.

Misconduct of Railway Servants.—At Greenwich police office on Tuesday, William M'Carthy and Henry Hatfield, two servants of the Croydon Railway Company, were charged under Lord Seymour's Act with neglect of duty. Mr. Seaman, superintendent of the Croydon railway police, stated that it was the duty of the defendants to keep the line clear for the trains at the Dartmouth Arms station. He was proceeding to London by the half-past 8 o'clock train on Friday night, when near the above station a signal was given to stop for passengers. In consequence of one of the switchers or tongues not being placed right, the train turned up a branch line, and immediately after came in contact with some coal trucks with great violence. The train would have proceeded at full speed if the signal to stop for passengers had not been given, and the concussion would have been of the most frightful description. M'Carthy, in his defence, said that having other duties to perform, the turning of the switcher had been accidentally neglected. Mr. Jeremy, the magistrate, said, had the accident been attended with loss of life, the defendants would have been liable to have been transported for life. He convicted each of the prisoners in the penalty of £10, and said but for the character they had borne, he would have imposed the degrading penalty of imprisonment and hard labor.

RAILWAY ACCIDENTS.

Breaking of a Wheel.—An accident of an unusual character happened on Tuesday, as one of the morning trains was passing between the Slough and West Drayton stations. One of the wheels belonging to a second-class carriage broke up, fortunately without throwing the train off the rails, though not without hazard to life and limb. The metal rim forming the disc of the wheel became severed and detached, leaving the bare spokes in contact with the rail. The pieces of iron thrown off, resembling the tire of ordinary carriage wheels, but of course of much greater solidity, were driven with frightful violence through the floor of the carriage, slightly injuring a female who was seated nearly over the spot, and, striking through the slender partition or rails which divide the box compartments of the second class carriages, inflicted a very severe injury on a gentleman with whom the piece of metal came so suddenly and unexpectedly in contact. The train was brought slowly into the Drayton station, where the sufferer was lifted out, and every attention promptly rendered.

FOREIGN RAILWAYS.

Effects of Railroads in Belgium.—The following notice of the beneficial changes produced in Belgium by the operation of railroads is taken from the *Echo de Valenciennes* of the 1st inst.:—The railroads in Belgium are every where very nearly finished, and their progress makes a daily change in the aspect and manners of the country. For instance, it cannot be imagined how great have been the advantages derived by Brussels, in consequence of the centralisation caused by the lines of railroad which terminate there, and which bring an immense concourse of people within its walls. They are building in every direction; they are on all sides erecting immense warehouses and new places of residence. Landed proprietors who lived at the distance of twenty or thirty leagues from Brussels, and who remained there in order to superintend their estates, now come to reside in the capital. The railroad gives them the opportunity of going in a few hours to overlook their affairs, and of returning to their residence. The opening of these new roads inspires the whole population with a locomotive propensity, which is increased by the facility and little expense with which the journeys are accomplished. The method of transacting business is subject to a similar change. Formerly it was necessary to enter into treaty in writing, and the preliminaries lasted a long time. These things are now transacted by personal intercourse, and are very soon arranged. The province of Brabant contains no coal mines; but by means of the railway it is now only a few hours distance from the coal mines of Liege, whence it is chiefly supplied with coal by the locomotive steam power.

The Chamber of Commerce of Dunkirk has petitioned government to undertake the formation of a railroad from Dunkirk to Lille.

Proposed Railway from Bombay to Calcutta.—Between some of the Bombay and Bengal journals there has been a discussion respecting the expediency of a railroad between Bombay and Calcutta. On one side it is argued, that although the residents at Calcutta would, on some occasions, derive great advantage from having a line of steamers for themselves, by the Red Sea, the time occupied by the vessel on her voyage from Suez round Cape Comorin would be less certain in point of time, at least eight months in the year, than the communication by the shorter line from Suez to Bombay, completed by the *dak* in 11 or 12 days, even in the present state of the roads. Hence it is inferred that a railroad would be particularly advantageous, while the expense is estimated at no more than 500,000*l*., since it would be the means of accelerating the *dak* by one-half at least for some periods of the year, and always by one-third, and the advocates of this railroad remind their readers, that the "comprehensive" plan for starting Indian

steamers would cost 100,000*l.* more than such an undertaking. Indeed, an idea seems to be entertained that the money required by the "comprehensives" might be advantageously expended in opening a road for the use of wheel carriages between the two Presidencies, as such a plan would secure the advantages which Calcutta proposes to gain by steam communication with Egypt, and a return, it is said, would be made for capital expended in the shape of toll-duties and mail contracts. The primary outlay on such a scheme would, it is calculated, be less by one-fifth, while the annual expenditure would be less by four-fifths, than that required for steam communication. On the other side it is argued, that although the expenditure of 500,000*l.* on a road might bring the mails from Bombay in five or six days, the road would take so long to construct, that before its completion there would be every chance of an improvement in steam navigation, which would turn the scale in favour of the latter. The fear of such improvement, by which the use of a road would be in a great measure superseded, would, it is said, render it extremely improbable that such a speculation should be selected to embark capital in. Another objection to the road, which is quite independent of this one, is that the benefits it would confer would be too confined. The 500,000*l.* thus expended would only construct a road to Calcutta, and half that sum in addition would be required to give similar advantages to Madras and Ceylon, while the expense of constructing roads to all the principal stations would in the end be infinitely greater than that of steam navigation.

A BILL FOR THE BETTER REGULATION OF RAILWAYS.

[Note.—The words printed in *Italics* are proposed to be inserted in the Committee.]

Whereas by an act passed in the third and fourth years of the reign of her present Majesty, intituled, "An Act for Regulating Railways," provision was made for the supervision of railways:

And whereas it is expedient, for the safety of the public, to make further provision for that purpose: Be it enacted, by the Queen's most excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, that this act shall come into operation on the *passing thereof*.

And be it enacted, that the provisions of the said recited act and of this act shall be construed together as one act, except so far as the provisions of the said recited act are hereby repealed, or shall be inconsistent with the provisions of this act.

And whereas by the said recited act it is enacted, that after two months from the passing of the said recited act, no railway, or portion of any railway, shall be opened for the public conveyance of passengers or goods until one calendar month after notice in writing, of the intention of opening the same, shall have been given by the company to whom such railway shall belong to the Lords of the Committee of her Majesty's Privy Council appointed for trade and foreign plantations: and whereas by the said recited act it is also enacted, that if any railway, or portion of any railway, shall be opened without due notice as aforesaid, the company to whom such railway shall belong shall forfeit to her Majesty the sum of twenty pounds for every day during which the same shall continue open, until the expiration of one calendar month after the company shall have given the like notice as is herein-before required before the opening of the railway, and any such penalty may be recovered in any of her Majesty's courts of record; be it enacted, that the said recited provisions of the said act shall be and they are hereby repealed.

And be it enacted, that no railway, or portion of any railway, shall be opened for the public conveyance of passengers until *one calendar month* after notice in writing of the intention of opening the same shall have been given by the company to whom such railway shall belong to the Lords of the Committee of her Majesty's Privy Council appointed for trade and foreign plantations, and until *ten* days after notice in writing shall have been given by the said company to the Lords of the said Committee that the said railway, or portion of railway, is sufficiently completed for the safe conveyance of passengers, and ready for inspection.

And be it enacted, that if any railway, or portion of any railway, shall be opened without such notice as aforesaid, the company to whom such railway shall belong shall forfeit to her Majesty the sum of *twenty pounds* for every day during which the same shall continue open until the said notices shall have been duly given and shall have expired; and every such penalty may be recovered in any of her Majesty's courts of record.

And be it enacted, that if the Lords of the said Committee shall be of opinion that the opening of any railway, or portion of a railway, would be attended with danger to the public, it shall be lawful for the Lords of the said Committee from time to time to order and direct the company to whom such railway shall belong to postpone such opening for any period not exceeding *one calendar month* at any one time, until it shall appear to the Lords of the said Committee that such opening may take place without danger to the public; and if any such railway, or any portion thereof, shall be opened contrary to any such order and direction of the Lords of the said Committee, the company to whom such railway shall belong shall forfeit to her Majesty the sum of *twenty pounds* for every day during which the same shall continue open contrary to such order and direction, and such penalty may be recovered in any of her Majesty's courts of record.

And be it enacted, that the Lords of the said Committee may order and direct any railway company to make up and deliver to them such returns of accidents occurring in the course of the public traffic upon the railway belonging to such company, and also such returns of the arrangements for conducting the public traffic thereon, as the Lords of the said Committee shall deem necessary for their information with a view to the public safety; and if any returns herein mentioned shall not be so delivered within *seven* days after the same shall have been required, every such company shall forfeit to her Majesty the sum of *twenty pounds* for every day during which the said company shall neglect to deliver the same; and every such penalty may be recovered in any of her Majesty's courts of record.

And whereas by the said recited act it is enacted, that every officer of any company who shall wilfully make any false return to the Lords of the said Committee shall be deemed guilty of a misdemeanor: and whereas it is expedient to extend the said provision; be it enacted, that the said provision shall be and is hereby repealed.

And be it enacted, that every officer of any company who shall wilfully give or make any false notice or return, or certificate or other instrument or document which shall be required to be given or made for the purpose of this and the said recited act, to or for the use of the Lords of the said Committee, shall be deemed guilty of a *misdemeanor*.

And be it enacted, that it shall be lawful for the Lords of the said Committee to issue from time to time such regulations as they shall deem necessary for the prevention of accidents upon railways: provided always, that such regulations shall not prescribe any thing of an experimental nature, nor interfere with the number of trains, nor with the times of starting trains, nor with the speed of travelling on any railway, further than is necessary for the purpose of preserving an interval of not more than *fifteen* minutes between succeeding trains: provided also, that no such regulation as aforesaid shall be binding upon any railway company, unless the Lords of the said Committee shall have given to such company *twenty-one days'* notice of their intention to issue the same.

And be it enacted, that if any company shall fail to observe any such regulation of the Lords of the said Committee, such company shall forfeit to her Majesty the sum of *twenty pounds* for every day during which such company shall so fail to observe any such regulation; and every such penalty may be recovered in any of her Majesty's courts of record.

And be it enacted, that whenever the Lords of the said Committee shall order the postponement of the opening of any railway, or portion of a railway, or shall issue any regulation for the prevention of accidents, in pursuance of the provisions in that behalf in this act contained, they shall make a minute specifying the grounds of such order or regulation; and copies of every such minute shall be laid before both Houses of Parliament within *one month* after such minute shall be made, if Parliament be then sitting, and if Parliament be not sitting, then within *one month* after the commencement of the next session of Parliament.

And whereas by the said recited act, the Lords of the said Committee are empowered to disallow all bye-laws, orders, rules, or regulations made by railway companies which shall impose penalties for the enforcement thereof upon persons other than the servants of such companies, and for that purpose all such bye-laws, orders, rules, or regulations are thereby required to be laid before the Lords of the said Committee: and whereas it is expedient to extend the provisions of the said act to all such bye-laws, orders, rules, or regulations as are of a public nature, and that without regard to the penalties thereby imposed; be it enacted, that all bye-laws, orders, rules, or regulations made, or to be hereafter made, by any railway company, which are of a public nature, and relate to or affect other persons than the proprietors, officers, and servants of such company, shall be returned to the Lords of the said committee, and shall be subject to the powers and provisions in the said act contained in regard to the bye-laws, orders, rules, and regulations therein mentioned.

And be it enacted, that on and after the next after the passing of this act, no person shall be employed on any railway as an engine driver in the course of the public traffic unless he shall have been licensed in pursuance of the provisions of this act in that behalf; and if any person shall be so employed on any railway without having first deposited his license with the company to which such railway shall belong, such company shall forfeit to her Majesty the sum of *five pounds* for every day during which such person shall be so employed, and every such penalty may be recovered in any of her Majesty's courts of record.

Provided always, and be it enacted, that in cases of emergency it shall be lawful for any railway company to employ any competent person, whether duly licensed or not, to act as engine driver in the course of the public traffic, for any period not exceeding *seven* days, or such further period as shall be sanctioned on each occasion by the Lords of the said Committee: provided always, that whenever an unlicensed person shall be employed, the company shall give to the Lords of the said Committee, within *forty-eight* hours after such employment, notice thereof, together with a statement of the reasons thereof.

And be it enacted, that it shall be lawful for the Lords of the said Committee to cause to be examined any person nominated by any railway company for the purpose of being licensed to act as engine-driver, and to license any such person as shall appear to the Lords of the said Committee to be duly qualified for that purpose, and, if and when they see fit, to revoke or suspend the license of any such person.

And be it enacted, that it shall be lawful for the Lords of the said Committee to appoint, from time to time, two or more persons, one of whom shall be the engineer of the company, or some engineer selected by the company, by whom the candidates to be examined shall have been nominated, to examine the candidates for licenses to act as engine-drivers, and the said examiners shall examine such candidates at such times and in such manner as the Lords of the said Committee shall appoint.

And be it enacted, that there shall be kept in the office of the Committee of Privy Council for trade and foreign plantations, a register of licenses, in which shall be entered the particulars of every license granted in pursuance of this act; and in all courts, and before any justice of the peace, and upon all occasions whatsoever, certified copies of the entries made or contained in such register shall be received as evidence, and be deemed sufficient proof of all matters and things therein registered or contained, without requiring the production of any such register, or of any license or other document upon which such entries shall be founded, and without any further proof than the production of such certified copies; and every person shall be at liberty to inspect any such register at all seasonable times without payment of any fee or reward.

And be it enacted, that it shall be lawful for the Lords of the said Committee to provide badges to be worn by licensed engine-drivers; and every engine-driver to whom any such badge shall have been given shall at all times during his employment upon any railway in the course of the public traffic thereon, and when he shall be required to appear before any justice of the peace, wear such badge conspicuously upon his breast, in such manner that the number thereon shall be distinctly visible and legible.

And be it enacted, that if any person shall act as an engine-driver upon any railway in the course of the public traffic thereon without having a license, or if any licensed person shall transfer or lend his license or badge, or shall act as engine-driver in the course of the public traffic, or attend when required before any justice of the peace without wearing such badge in manner herein-before required, he shall forfeit to her Majesty for every such offence a sum not exceeding *five pounds*.

And be it enacted, that if any person shall forge or counterfeit, or shall cause or procure to be forged, counterfeited, or resembled, any license or badge to be provided under this act for an engine-driver, or if any person shall sell or exchange, or expose to sale or utter, any such forged or counterfeited license or badge, or if any person shall knowingly and without lawful cause (the proof whereof shall lie on the person accused) have or be possessed of such forged or counterfeited license or badge, every person so offending, and every person knowingly and wilfully aiding, abetting, or assisting any person in committing any such offence as aforesaid, shall be deemed guilty of a *misdemeanor*.

And be it enacted, that every railway company shall retain in their custody the license of every engine-driver employed by them, so long as such engine-driver shall be in their employment; and in case such engine-driver shall leave, or be dismissed from, or shall die in their service, such company shall forthwith give notice thereof in writing to the Lords of the said Committee, and shall retain the license of such engine-driver until they shall have received directions from the Lords of the said Committee as to the disposal of such license; and if such company shall not give such notice as aforesaid, or shall dispose of such license without or contrary to the directions of the Lords of the said Committee, every such company shall forfeit to her Majesty for each offence the sum of *twenty pounds*; and every such penalty may be recovered in any of her Majesty's courts of record.

[The concluding clauses of the act refer to the mode of enforcing penalties under £5, and to other minor arrangements for carrying the act into effect.]

ABSTRACT OF THE RAILWAY REPORT TO THE BOARD OF TRADE.

The report of the officers of the railway department of the Board of Trade is, in its most important results, embodied in the Act of Parliament for the regulation of railways, which we have inserted elsewhere. There are, however, some details in the report which serve as the groundwork on which their recommendations are founded, and explain the proposed mode of working the government plan, that deserve to be more particularly set forth. The report, for instance, gives an account of the accidents, attended with personal injury, occurring in the course of public traffic, from the 7th of August 1840 to the 25th of last January, in which the number of killed and injured, the nature of the accidents, and their causes, are specified. The number of accidents thus noticed is thirty-five; the number of persons killed twenty-eight. The number of those injured could not always be correctly ascertained; but it may be estimated at 160.

"This list," observes the report, "is confined to accidents of a public nature, and excludes the numerous cases of accidents which have occurred to servants of the company under circumstances not involving danger to the passengers or public, and also of accidents which are attributable to carelessness or misconduct on the part of the person injured. It is exclusive also of accidents unattended with personal injury, respecting which we have no power of calling for returns. The term 'defective arrangement' has been used in stating the cause of the accident, not as necessarily implying neglect on the part of the company, but simply as stating the fact, that the accident is one which under an improved system of arrangements might have been prevented.

"The following results appear from this list:—

"1st. Out of 35 railway accidents which have occurred in the course of five months, 21 are attributable, among other causes, to 'defective arrangements.'

"2d. Eighteen are attributable to 'misconduct of servants;' and,

"3d. Six are attributable to mechanical causes, among which the breaking of axles occupies a prominent place.

"With reference to these results, the following observations suggest themselves:—

"1. The inherent danger of railway travelling is very small, and even under the present system less than that of other modes of conveyance.

"2. It is not, however, by reference to comparative, but to absolute safety, that the question must be considered. *The public have a right to expect that the maximum degree of safety which the nature of the case admits should be attained, without reference to the safety of other modes of travelling.* This is the more necessary, as railway accidents, when they do occur, are frequently of a frightful character, and calculated to cause a panic in the public mind, which materially diminishes the benefit which the country would otherwise derive from this improved mode of conveyance.

"3. The maximum degree of safety is far from being attained in practice, as appears from the fact that a great majority of the accidents above referred to have arisen from causes not in any respect inherent to the nature of locomotive travelling, and which might have been avoided by the adoption of a better system of arrangement."

In reference to the plan of licensing the engine-drivers, and the kind of examination it is intended they should undergo, the report affords much more information than can be obtained from the clauses of the bill.

"The system of licensing would provide an effectual remedy, by making a strict and undeviating attention to character and conduct the necessary condition of obtaining and retaining employment.

"The adoption of such a system, in conjunction with the system introduced on the London and Birmingham, Great Western, North Midland, Grand Junction, and other principal railways, of giving premiums for good conduct, and taking measures for promoting the mental improvement and physical comforts of engine-drivers, would, there is every reason to believe, soon raise their character to a standard which would afford much greater confidence and security to the public.

"With regard to the nature of the examination, it appears a fair subject of doubt, whether any high degree of mechanical knowledge is requisite on the part of engine-drivers, and could be attained without sacrificing qualities of more importance, for the discharge of duties which require great capabilities of enduring exposure, and unremitting attention to a limited range of duties. However this may be, it appears better, in conformity with the principle already stated of abstaining from interference in questions of an experimental nature, to confine the examination to those points upon the necessity of which no difference of opinion can exist.

"For instance, there can be no doubt:—

"1st. That an engine-driver should be able to read his instructions, and should fully understand them.

"2d. That he should have a competent experience and practical knowledge of the ordinary duties necessary for the management of an engine.

"3d. That he should know what course to adopt in any of the emergencies which can be foreseen as likely to arise in the course of his employment.

"4th. That he should be able to produce an unimpeachable character for sobriety, steadiness, attention to orders, and general good conduct.

"These may be looked upon as conditions which the public has a right to expect, and which ought to be introduced generally at the earliest possible period; at the same time, however, it must be borne in mind, that great discretion will be necessary in the first instance, especially with regard to engine-drivers already in the employment of railway companies.

"With regard to the details of the system of licence and examination we should recommend:—

"1st. That it should commence at a period of three months from the passing of the Act, and apply to all engine-drivers employed in the course of the public traffic.

"2d. That all candidates for licences should be brought forward by railway companies.

"3d. That the examination should be conducted by not less than two persons nominated by the Board of Trade, one of whom, as a general rule, should be the engineer of the company by whom the candidates are brought forward; the final decision of each case resting with the Board of Trade."

TO CORRESPONDENTS.

We shall be glad to receive the communication offered by a "subscriber."

Mr. Whishaw's work on railways has been received, and will shortly be noticed.

Notices of the "Year Book of Facts in Science and Art," and Mr. Templeton's "Locomotive Engine Popularly Explained," were prepared for insertion this week, but, with other articles, are unavoidably postponed from a press of matter.

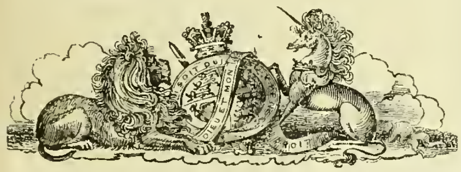
The report of, M. Birch's lecture at the Royal Institution, is unwittingly postponed from the same cause.

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of to-day.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 20 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes containing the Nos. of every 6 months.

The Trapesium Paddle Wheel shall be noticed next week.



THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, FEBRUARY 13, 1841.

The bill introduced by the Government for the regulation of railways, and the report of the officors of the railway department of the Board of Trade, on which the bill is founded, have been printed, and are now before us. The bill is, in fact, merely an abstract of the inspectors' report. We last week stated, writing only from the report of M. Labouchere's speech on introducing the bill, that its principle was well founded; that it was calculated greatly to improve the efficieucy of railway management, without interfering in a manner to deprive railway directors of their proper degree of authority and responsibility. The character of the bill we then gave is borne out by its various provisions. The measure proceeds strictly on the principle recommended by the railway department of the Board of Trade as desirable to regulate the naturo and extent of the powers to be vested in that board. In that portion of their report the inspectors observe:—

"The proper distinction appears to us to be, that the Government should not attempt to interfere in questions of an experimental nature, which are still subjects of discussion, and admit of a fair difference of opinion among practical men; nor should it attempt to regulate matters of detail, so as to take the management of the railways out of the hands of the parties immediately responsible, viz.—the directors and their officers.

"On the other hand, the Government should have the power of enforcing, whenever it is found necessary, the observance of all precautions and regulations which are approved of by experience, and are obviously conducive to the public safety. For instance, upon such points as the comparative advantages of six and four-wheeled engines, the best construction and mode of laying down rails, the best form and construction of wheels, axles, &c., and other points of a similar nature, upon which the practice of the best conducted railways differs, and the opinion of the most eminent engineers is by no means decided, it would be premature for the Government to interfere until experience has solved the questions which may still be fairly considered as doubtful. But with regard to other points, such as the propriety of introducing upon every railway such arrangements respecting time tables and signals as experience has shown to be necessary for preventing collision, of establishing a proper and uniform code of regulations for engine-drivers, guards, and other servants placed in a responsible situation, and for maintaining strict discipline; and generally of introducing upon ALL railways whatever has been adopted and proved to be conducive to safety by the practice of those which are considered to be the best conducted, no difference of opinion can exist, and if the principle of government supervision be admitted at all, it cannot find a more legitimate field for its exercise."

Proceeding, therefore, upon this principle, it is not intended to introduco any provision for the more effective working of locomotive engines than that of insisting on a previous examination of the qualifications of the engineers, and the granting of licences to those who have passed such examination. The licensing system will, as far as it goes, be a great improvement. It will, in the first place, bo the means of preventing persons decidedly unfit for so responsible a duty from having the charge of trains; and it will operate as a much-wanted check against misconduct; because the companies will hold the licences, and thus prevent any engineer who has neglected his duty, or conducted himself improperly, from gaining employment on other railways. Hitherto the companies had no check on these men; and it too often happens that an engine-driver who has been discharged from one railway for misconduct, is readily taken into the employ of another, without proper examination. Any alteration which tends to test the fitness and to raise the moral character and station of these important officers must be hailed as a beneficial change; though we are not sanguine enough to believe that any effectual remedy for the mischiefs arising from the want of skill, or care, or presence of mind in the enginoer, can be provided, until a superior officer be appointed to command each train, under whose superintendence the engineer is to act. At the railway conference, however, this plan was rejected; and the Government very properly abstains from enforcing experimental arrangements. Wo believe, however, that time will show the fallacy of the objections raised to such a plan, and the necessity of its adoption; if the greatest attainable security be made, as it ought to be, the rule for guidance in railway management. In the meantime, we are glad to take the licensing system, accompanied by the other regulations for the moro perfect working of railways, as an "instalment" of safety.

The Copyright Bill has been rejected by the House of Commons by a small majority on the second reading. This augurs badly for all attempts to obtain increased protection for inventors; the same principle being involved in both cases. A measure for extending tho copyright of patterns on printed calicoes and muslins has been since introduced into the Commons, and, judging from tho opposition it met with on the first reading, it appears to have little chance of success. The curious objection urged by Mr. Mark Philips, forms the strongest argument that could be adduced in favor of increased protection. He admits that the extension of copyright in designs would be the means of improving the manufacture: his singular objection is, that they would be improved too much. The French manufacturers, he says, would then bo induced to copy our patterns, and would send their imitation goods, at a cheaper price, to the English market! We could not wish to see a more complete illustration of the advantage of increasing the protection to inventors than such a state of things as Mr. Philips deprecates.

THE ACTION OF HYDRAULIC BELTS.

It is our dosire at all times to promote discussion, and the investigation of any subject of scientific inquiry, and to give publicity to the opinions of our correspondents, even though they differ from our own. Acting on this principle we have inserted a letter from a correspondent at Edinburgh, in which he attempts to expose the "errors" which he says we have committed in our explanation of the action of hydraulic belts. We have read his letter carefully, but without perceiving the "error' which he endeavors to correct; and it appears to us, that the statement of our correspondent is more liable to the imputation of error than our own. He sets out with denying the principle "that the amount of power exerted by all constantly acting forces is in proportion to the *time* of their action." We have recently explained our views on this question so fully, and have illustrated our opinions in such varieties of ways, that we will not now repeat our former arguments. On this point we and our Edinburgh correspondent are at issue. We maintain our previously-stated opinions, and would fain presume that he would concur, had he carefully read them. It is in consequence of his not, as we conceive, having fully considered this point, that he asserts, "as often as the column or belt of water is renewed, the power to overcomo its gravitation must be as frequently renewed." If this were the case, the employment of hydraulic belts would, indeed, cause a great waste of power. But that it is not so may be readily proved. The weight of the column of water must, wo contend, be the same, whether tho column be moving quickly or not moving at all. No increase of rapidity to the motion of the same column could increase its *weight*, therefore, during the same time of action, its gravitating force would require the same power to counteract it, whether moving or stationary. Suppose, for example, that the weight of

the column were 15 lbs., a power must be exerted equivalent to 15 lbs. to suspend that column; and, as we maintain, no more than the 15 lbs. of power would be required *to overcome the force of gravitation*, with whatever velocity the column of water were moving. We grant that additional power would be required to communicate the additional velocity to the water, but not to lift it against the force of gravitation. The additional amount of power required would be merely that *requisite to communicate motion*, not to overcome the force of gravitation. The difference between the power required to communicate horizontal motion and that required to communicate motion against the force of gravitation we need not point out. The advantage of the hydraulic belt over buckets is simply this: that owing to the greater velocity of the water, an equal quantity may be raised when the weight lifted at any one time is far less.

NEW INVENTIONS.

NEW INDELIBLE INK.

M. Bezanger has sent to the French Academy of Sciences a description of a new economical ink, for which he has taken out a patent. It consists of lamp-black mixed with caustic soda, and gelatine and caustic soda. By adding an aromatic gum to this ink, it is difficult to distinguish it from Chinese ink, its qualities being the same, alkaline and indelible, but its cost much less.—*Moniteur Industriel.*

IMPROVEMENTS IN THE ELECTROTYPE.

At the sitting of the French Academy of Sciences, on the 1st inst., M. Mellonie made the following communication in the name of M. Cirelli, mentioning an improved method he has adopted of taking impressions in copper by the electrotypic process, directly from the drawings on paper.

"M. Cirelli, director of the Polygraphic Institution, at Naples, has sent a letter and various documents to me, relative to a new method of engraving on metal, by means of the galvanoplastic process. The first attempts of M. Cirelli commenced many months ago. Two Italian periodical papers, the *Lucifer* and the *Journal du Royaume des Deux Siciles*, allude to them in the numbers of the 15th of July, 1840. The inventor did not propose to obtain the copy of a model, or of an engraved plate, either indented or in relief, by two successive operations, but, by means quite independent of the art of engraving to immediately produce the metallic plate accurately engraved, from a design, a lithographic print, or any other copy drawn on paper. M. Cirelli has already obtained a patent to make use of his method in the kingdom of Naples. He is not unacquainted with the galvanoplastic discoveries of Messrs. Boquillon, Sayez, Jugé, and Kobell; but he adds, that the investigations of these gentlemen are entirely different from his own; thus he has thought it desirable to distinguish the new art, which he has just discovered, by the particular denomination of electrotypy." We shall give an extract from M. Cirelli's letter. After briefly adverting to the principle on which the deposition of the metal is obtained from the solution of the sulphate of copper, he observes :—"In order to explain myself more clearly, I will submit to you the problems that I have proposed to myself, which I have solved.

"First.—A design being given of any description whatever, traced upon paper, with certain peculiarities, which in no degree increase the difficulties of the artist, to produce the engraving of the same design on a sheet of revivified copper, by the process of Jacobi, and this to take place during the time that the sheet is forming, and without the hand of the engraver having any thing to do with it.

"Second.—A proof of an engraving being given, drawn with certain precautions, either from a plate engraved on copper or on steel, or from a lithographic design, to form in the same manner an engraving from this proof.

"Third.—Having obtained the first engraved plate in the manner that I have mentioned, to repeat the operation many times successively on the same design, or on the same proof, so as to produce a great number of engraved plates, and all exactly similar, which only requires the time and expense necessary for the precipitation of the copper."

In support of these propositions, M. Cirelli sent four plates, which did not admit of the least doubt respecting their electro-chemical origin, because the engraving on the front surface was equally distinct on the back; the two designs exactly corresponded, line for line, point for point, in every part. The first of these plates presented the figure of Volta with letters, and an outer line ornamented with figures and arabesques; it was produced from a lithographic proof. The second, taken from a drawing, represents the Hebe of Canova. The two others are duplicate sketches of an inscription, in which the inventor dedicates his attempts to the Academy. The second metallic drawing appears more pure, and is better executed. M. Cirelli also added many specimens from proofs drawn on paper.

It may be said, further, that though these experiments appear very remarkable, they are capable of great improvement. The inventor proposes to submit to the examination of the Academy, new engravings, which he hopes to bring to perfection. This presentation he will accompany with a memoir, in which he will describe the modifications to which he has subjected the appatus of Jacobi and of Spencer; he will at the same time make known the various modifications of which electrotypy appears to him capable.

A GALVANO-ARSENICAL APPARATUS.

Mr. S. T. Martin, of the Royal Veterinary College, exhibited at the last meeting of the Royal Institution, this apparatus. The action depends upon a power well known, viz., that of resolving water into its constituents, and effecting the reduction of the metals.

The vessel and tubes being filled with a suspected fluid, rendered slightly sour by the addition of sulphuric acid (so as to make it a better conductor of electricity), is to be connected with a galvanic battery of a few plates, by means of electrodes dipping into mercury cups, when decomposition will immediately commence, and if any arsenic be present, the metal *arsenicum* will be resolved at the negative electrode in combination with hydrogen, forming arsenuretted hydrogen gas, which rising will displace the water in the tube.

As soon as the tube is full, the stop-cock is to be turned, and the gas inflamed as it issues from the jet, when on holding a piece of porcelain or a watch glass over the flame a metallic film will be deposited on it. That this is arsenicum is to be proved by the usual tests.

A solution of one grain of arsenious acid in a gallon of water, or of one part in above 70,000, has by it been made to yield many metallic films, and it is possible that the division might have been carried much farther, and yet indications of the existence of the poisonous agent obtained.

CONSTRUCTION OF THE IRON BRIDGE AT NANTES.

We last week translated from the *Echo du Monde Savant*, a description of the principle on which M. Polonceau is constructing the Pont d'Edre, at Nantes; we now give the remainder of the article.

Tubes bent in the shape of arches, which have been suggested by several engineers, would naturally occur to M. Polonceau as the best adapted to his purpose, but his progress was long delayed by the difficulties attending its execution. He at length determined to conquer them entirely by dividing the arches lengthways into two half tubes of equal size; by vertical sections passing through their axis, and separating them as into two shells; so that it may be said that each of the two arches is composed of two half tubes, joined and united on their concave sides.

This junction is effected by means of double rings. When the two half tubes intended to form an arch are brought into contact, their rings which unite and fasten together form two double projecting edges, one higher than the other. The casting of the half tubes being as easy as that of plain pieces, M. Polonceau was enabled to give the section of his arches any form he chose; he consequently adopted the oval form, the resistance in a perpendicular direction being much greater than the transverse resistance. Although it is much easier to cast half a tube than a whole one, it is impossible at present to cast in a single piece the half tube of an entire arch, therefore each of the halves of the arch was subdivided into parts of moderate length, that could be easily cast and arranged, but taking care to reunite each segment so that each of the joinings in the half tubes, which form one of the surfaces of the arch, should always meet in the middle of the space comprised between two consecutive joinings of the half tubes on the opposite surface; by these means no point can extend beyond the centre of the arch, and the joinings presented by one of these surfaces cross and alternate regularly with the joining of the other. Once placed, the extremity of each arch is supported on a foundation of cast iron partly fixed into the buttresses of the bridges and supported on a bed of mortar. The cavities of the tubes of the arches are filled either with mortar or other substance, which is run in by means of openings for this purpose at equal distances between the fastenings. This filling-up of the tubes is necessary to prevent the effect of shocks, and to diminish vibration.

The tympans, that is, the space between the arches and the roadway, are furnished with a series of small rings, diminishing in diameter as they approach the summit of the arches. These rings are connected together by clamps of forged iron. They do not adhere to the arches nor to the sides of the platform, so that whatever may be the inevitable difference in the vibrations of the different parts which form the arches as well as in their expansions, no fracture is to be apprehended.

The bridge of Erdre is composed of one arch about 21 metres in span. This arch is formed by five arcs in cast-iron, with rings, &c. Each arc is formed of 17 demi-arcs, as we have before described. The total width of the platform will be upwards of 12 metres, eight for the carriage road, and two on each side for the foot-paths. At night the approach to the bridge will be lighted with gas by four handsome chandeliers in cast iron.

Before the different parts were fixed, the administration of roads and bridges had them subjected to trials which have guaranteed its solidity. Thus Nantes will in a short time possess a monument worthy of her beautiful line of quays—worthy to serve as a portico to the entrance of the British Channel.

ACTION OF HYDRAULIC BELTS.

(To the Editor of the Inventors' Advocate.)

SIR,—Allow me to drop you a few lines, to point out some errors you have published in your last number of the INVENTORS' ADVOCATE. You have an article on the "Action of Hydraulic Belts," in which you fall into a great error in asserting "that the amount of power exerted by all constantly acting forces, is *in proportion to the time of their action.*" This, no doubt, is one item in the calculation; but almost every mechanic knows that *velocity* must also be considered.

It is evident that the amonnt of gravitation of the water on the belt at any given moment is the same, but if the belt is moved at great velocity, and a *new* column be lifted, there must be a power to overcome the gravitation of this new column; and as often as the column or belt of water is renewed, the power to overcome its gravitation must *as frequently be renewed.* In short, the water lifted may be looked on as a *weight* to be lifted; and if it be lifted *quickly*, a greater *first power* must be exerted to put it in motion. You seem to consider the belt preferable to buckets, in which idea I differ from you. In the case of the bucket there is no *slip* or losing hold of the water; a given power lifts an equal weight, less the friction. In the case of the belt, the given power cannot lift an equal weight, as the water slips by the power of gravitation. Suppose a well 32 feet deep, and the water to be drawn up; suppose, further, that a belt is used, to the surface of which a cubic inch of water adheres on every lineal inch of the belt; this would give 384 cubic inches suspended at any given time on the belt, and which 384 cubic inches would weigh about 15 lbs. Now, to raise this weight of water, 15 lbs. of power must be exerted, and at a velocity at least equal to the velocity of the belt. We find 15 lbs. always suspended or adhering to the belt, but we do not move this adhering water at the same velocity as the belt, on account of the *slip*, or gravitation of the water, not being supported sufficiently, as in the bucket. While, then, the belt has moved upwards 32 feet, the water adhering will have moved through that space *less the slip*, which, whatever it may be, is a decided loss of power. If, while the belt has revolved the 32 feet, the water has slipped 10 feet, there would be a loss of nearly one third of power. In short, the belt is one power, and gravitation another; and it is the *surplus* power of the one over the other that is the *effective working power*. We all know that if a steam vessel can sail at 10 miles an hour in still water, if the tide run 4 miles an hour against her, the effect produced is only six miles an hour of advance, notwithstanding the engine has been exerting the very same power as before.

There is a method of *blowing* water upwards in the condition of *spray*, and this depends on the force of wind overcoming gravitation. It is a clear axiom, however, that to whatever extent an opposing power operates, the effect of the other power must be so much diminished. This is also illustrated in the slip of paddle-wheels in the water, a certain portion of power being expended in *giving motion to the water*, and *not* to the ship.

I may mention also that the Hydraulic Belt works to disadvantage from throwing off the water at the tangent with *great velocity.*

That velocity has been given at an expense of power, and when the water is thrown off it strikes the reservoir with considerable *force*, and which force is so much power spent ineffectually. In all cases where a fluid leaves a pump belt or water-wheel with much velocity, there is a waste of power; for velocity in water gives out its power against the body on which it impinges, which may either be a water-wheel (which would revolve), or tail water, or any solid immoveable object. Another source of loss of power in the working of the belt is the friction in passing amongst or through the water in the well, by giving motion to a considerable quantity of water from that friction, so that it may be said of the *Hydraulic Belt*, that it may form a cheap and convenient apparatus for lifting fluids from considerable depths, but at an extra expense of power as compared with *lifting buckets.*

You also fall into error regarding the principle of action of the rotary engine. You say it is the "re-action" of the air against the force of the steam as it issues from the apertures at the end of the revolving arms. Now you tell us these arms work into a case in which steam is confined, so that the "air" has nothing to do with the matter. In fact, if it were possible to get the arms "*in vacuo*," it would be preferable, as friction would be reduced. The principle of the rotary engine is simply the *surplus* of pressure on the arms in one direction, above what the pressure of the steam is in the opposite direction. If steam exert a pressure of 60 lbs. to the square inch, it will be seen that if an aperture of a square inch be made on one side of a revolving arm, that the pressure on *that* side of the arm is reduced by 60 lbs., thus creating a surplus force of that extent to propel the arm in the opposite direction to the aperture.

Edinburgh. Yours truly,
Feb. 3, 1841. A SUBSCRIBER.

[We have elsewhere alluded to that part of our correspondent's letter referring to the hydraulic belt. With respect to his remarks on the action of the rotary engine, we fear that our description of the apparatus was not sufficiently clear, otherwise he must have perceived that the motion could not proceed from any other cause than *reaction*, whether of the air, or of the circular case in which the arms revolve.]

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(Contributed expressly to the Inventors' Advocate.)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING FEBRUARY 15, 1841.

Monday	Statistical Society	8	P.M.
	Medical Society	8	P.M.
	Microscopical Society, (Anniversary)	8	P.M.
Tuesday	Linnæan Society	8	P.M.
	Horticultural Society	3	P.M.
	Inst. Civil Engineers	8	P.M.
Wednesday	Society of Arts	8	P.M.
	Microscopical Society	8	P.M.
	London Institution	7	P.M.
Thursday,	Royal Society	8½	P.M.
	Society of Antiquaries	8	P.M.
	Numismatic Society	8	P.M.
Friday	Geological Society (Anniversary)	1	P.M.
	Royal Institution	8½	P.M.
	Botanical Society	8	P.M.
Saturday	Asiatic Society	2	P.M.
	Westminster Medical Society	8	P.M.
	Mathematical Society	8	P.M.

BOTANICAL SOCIETY OF LONDON.

Feb. 5. Daniel Cooper, Esq., A. L. S., Curator, in the Chair.

A parcel of plants from the Botanical Society of Edinburgh, was announced as having been received since the last meeting. A communication was read from Dr. W. H. Willshire, now travelling in Morocco, in a letter addressed to Mr. D. Cooper, dated Morocco, Dec. 15, 1840, of which the following is a copy:—

"From the interest which was evinced by some of the members of the Botanical Society of London, with which I have the honor to be connected, concerning my project of making a tour in some parts of Africa, with a view to botanical pursuits, I hope I have not judged wrongly in troubling them with the following, and in asking you to be the medium through which it may be made. I left London on July 17th, 1840, and arrived at Swearah (or the Picture, or the Beautiful) on the 11th of August ensuing. Of this place I may remark, that it is the chief sea-port town of the empire of Morocco, and that portion of it in which Christians are allowed more liberty and freedom from interference than any where else. Soon after I arrived Mr. Willshire, her Majesty's Vice-Consul at this port, despatched the letter I bore from Lord Palmerston to Mr. Hay, her Majesty's Consul Geneial at Tangier, in which was stated the views I had in visiting Morocco, and asking permission from the Sultan for me to travel in his dominions for these purposes. This was made known to the Sultan by the Consul-General, together with my particular desire of travelling within the mountainous districts, and making a course from the capital of Morocco along the base of the great range of the Atlas to Tangier, as from the nature of the climate and country it would most probably be that in these situations my desires would be more amply fulfilled. The Sultan's answer was to the following effect;—that the inhabitants of these regions were "wild as the beasts," that they were ignorant barbarians, comprised of different tribes, speaking a diversity of tongues. That they could not distinguish between a Christian friend and a Christian foe, but that all Christians would be in jeopardy among them; that he could ensure me no safety there, and that therefore he could not allow me to go; but to Morocco I might proceed, and that when there the authorities would give me permission and protection to go where they might think proper and convenient. This answer at once annulled all hopes of travelling within the district of the hills, as neither the Sultan's permission nor his protection could be had; both of which are absolutely necessary for a Christian travelling in this land of sun and sand. But to return to Swearah. Having arrived in the month of August (and necessity was my master) I entered the country at a time when all was scorched up, sand, sand, sand, bareness, bareness, bareness; so that my hopes rested in the rain, which in about eight weeks time was expected to come on, and when all would be clothed in the mantle of green and beauty. In the mean time, however, I made some excursions near the city, along the banks of the Wadel Gored, a river laid down as taking its rise near Maskoretan, and falling into the sea about three quarters of an hour's ride from its source; the *Nerium*, *Oleander*, a *Lavandula*, *Statice*, and *Aquilegia*, were all that were to be seen in flower, and these in a few weeks time passed off. Land turtles and foxes were seen, and I was told that hyænas and leopards probably might be found higher up; at Wuljah, not far distant, an hyæna having carried off some cattle not long before I was there. The ornithologist, I think, would be more amply rewarded than a naturalist, following another branch of study.

"I made excursions likewise to the heights above the Wadel Gored. Here the *Elaeodendron Argana* grows in abundance, but it had passed flowering, and it does not ripen till about March. Amongst the rigid spiny dwarf trees of this plant a *Statice* was alone to be found. There was a species of leafless *Euphorbia*, however, which seems to be a denizen of almost every where, where nothing else was to be seen but stone and sand.

"I began to long for the rain, therefore, to make something spring, but this longing was soon quenched, as I found that when it did come, it could be of little use to me, as I began to discover that all journeying in this country is made on the mule, horse, or camel—that as relates to a Christian always, and to a native often, a soldier must accompany them to prevent insult or danger, and that the people not dreaming of the utility or purpose of your pursuits, offer not the least means of promoting them. That in the short time I could devote to travelling here I could not overcome the numerous obstacles which I found continually rise up; that I should fritter away time to no purpose that at least to me would appear equivalent for the outlay of time and trouble; that the rains still kept, and that therefore I had better at once throw aside my original intentions, and betake myself to that which I thought to a certain extent would repay me for my exertion.

"I have now had more experience of the country, and I can assure you I most heartily rejoice in having formed this resolution. The country (the district of it which at least I have gone over) is as barren now as it ever could be. The rains have

still kept off from Morocco, and nothing but a transient shower has visited the capital, up to the period when I am writing.

"I left Swearah for Morocco on the 16th of November, and through the whole five days' journey a *Ranunculaceous* plant was all that was seen in flower, and this only in one particular spot. On the second day's journey the thermometer stood at 88° Fahr., under the shade of an Arghan tree before noon. The (17th November) third day the skin began to crackle upon our faces, and on the fourth, one person of the party had erysipelatous vesicles on his face. The back of my mule (which was black) was so hot I could scarcely bear my hand upon it. From water to water was a day's journey. Nature laughed at Botany; and a herd of antelopes, black goats, and a troop of camels was all that was to be seen.

"I may tell you that whilst at Swearah, I saw the fruit of *Cactus Opuntia, Ficus Carica* (green), a species of *Arbutus, Water-melons, Grapes, Walnuts,* and *Pomegranates* in abundance. These were daily eaten along with *Tomatas* and the *Betel-john.* At Morocco, oranges, citrons, limes, sweet lemons, the fruit of the *quercus,* in other words a long narrow *acorn,* with the flavor of a Spanish chestnut, dates, &c., are now plentiful. Radishes grow to an enormous size, and these with the Kurshuff are more eaten than any other vegetable.

"I have seen the Imperial Gardens at Morocco. Palms (the date chiefly) olives, oranges, sweet lemons, citrons, limes, pomegranates, roses, violets, and narcissi, together with plenty of saffron and southern wood, are the chief inhabitants of this pleasant place in the hot capital of Barbary. In travelling from Swearah to Maremma, the *Chamœrops humilis* covers all the hills like brushwood, but very dwarf indeed. Near here Antelopes are found in numbers, but they are very shy indeed.

"To morrow, I leave Morocco for Tasremoot, and afterwards proceed from Tasremoot to Owreka, but must return again to Morocco, as the authorities demand it. They have refused me permission to cross the Atlas to go to the capital of Suze, the richest province of the empire; as no one at present is safe upon the road; the tribes are at open war with the governor of the province, and all is confusion. After I return to Morocco, it is my intention to go to Saffee.

"However much I have been disappointed in not being able to prosecute my original intentions, I can assure the members of the society I have reason to be glad of having betaken myself to something else. After having determined to give up scientific inquiry as my chief object, I took myself to a totally different one, and I have travelled as artist and general inquirer into the manners and aspects of this strange country. I hope I have succeeded pretty well as a delineator of places never before laid down by hand, and that I shall return with the representation of places and things, the danger and difficulty of delineating which has hitherto prevented their being made known. I have not forgotten to keep a jonrnal of the strange and novel customs of this country of the prophets—it is here that Mahomedanism exists in its greatest purity and power.—I have the honor to remain,

Your obedient servant,

W. HUGHES WILLSHIRE, M.D."

"To Daniel Cooper, Esq., &c., &c."

Some remarks relating to the subject having been made by the chairman, the society most cordially expressed their sentiments in favor of the above member, and a vote of thanks was directed to be conveyed to him for his interesting communication.

SOCIETY OF ARTS.

Feb. 10. *Illustration Meeting.*

Mr. Arthur Aikin, the late and respected secretary to this institution, delivered a lecture on "Woody Fibre, its structure and uses." Vegetables are composed of certain elementary organs, viz., cellular tissue—woody fibre—spiral vessels and ducts. The woody fibre is formed by fibres sent down from the leaves into the stem, somewhat after the manner of roots into the earth. The arrangement of these fibres varies according to the different classes. In the *out-growing trees* (Exogens) such as forest trees, a horizontal section of their stems exhibits the concentric mode of arrangement, (that is circle without circle) each of which corresponds to a year's deposit of woody matter, constituting in botanical phraseology, a *Zone.* In the *in-growing trees* (Endogens) palms and natives, mostly of warm climates, no such arrangement takes place, a confused mass of woody fibre being alone observed when examined in a similar manner to the former. To separate woody fibre, it is requisite to macerate or soften wood in water or weak acid, when the agglomerated fibres become distinct, and may readily be detached by a fine needle. When the fibre is subjected to microscopic examination, it will be found to be composed of a hollow tube tapering at each end (fusiform), one end of which partially overlaps its neighbor. The diameter varies very considerably in the common lime tree, it is from 100th to 150th of an inch—this is about the usual average of tho fibre of our native trees. It possesses great elasticity, a single fibre may be bent double without rupturing —which is not, however, the case when they are in a mass. There is considerable variety as to the degree of flexibility of woods—in the spring, when the sap is in the stem and the vital parts of the plant are in full action, the wood is much more brittle—and is on the contrary much less so in the autumn and winter, when the vital actions to a certain extent cease.

Woody fibre is rendered more flexible when (after it has been dried) it has been soaked in water—it is on this account that ship-builders steam their planks before applying them to the hull of the vessel—and also, that osier-workers steep their willow-twigs in water prior to using them for basket-making, &c. The most flexible of the British trees are the hazel, the beam tree, the dog-wood, and the willow. Considerable difference is also found in the degree of rigidity between the fibres of the root and that of the stem. In the remote parts of Ireland and Scotland, the peasantry dig up the roots of fir, which have been buried for ages in some of the bog earth, and from them obtain fibre of sufficient strength to form ropes for various purposes, such as for harness, &c. The roots of the liquorice (*Glycyrrhiza*) contain, in addition to a large proportion of mucilage, a considerable quantity of woody fibre, and is readily separated by repeated washing and boiling; by this the mucilage is dissolved and the fibre remains. In cases of need this plant might be most advantageously cultivated for this purpose.

Fibre is chiefly, however, obtained from the bark of plants. The bark of the lime tree is manufactured into very serviceable shoes by the Russian peasantry. The *bass* or *matting* of the gardens is obtained by macerating the stems of the lime tree in Russia, and separating the inner part of the bark (*liber*), it is then cut into strips and matted together. In the genus *Daphne,* to which the *Mezereon* belongs, there is a natural tendency of the fibres to cross each other, as in the *lace bark tree* (Daphne Laghetto) of Jamaica—this singular structure (*liber*) exactly resembles very delicate lace, and is manufactured into various articles of dress in the West Indian islands. When macerated in water and the fibres separated, it is used for veils, gloves, &c.; but when first separated without being opened, it makes excellent trowsers, and cordage when twisted.

(*To be continued in our next.*)

FOREIGN INTELLIGENCE.

FRANCE.

ACADEMY OF SCIENCES.

At the meeting of the Academy of Sciences, on the 1st inst., the following were among the subjects brought under consideration:—

M. Biot read some extracts of a letter from M. Talbot, in which he announced, that previous to the discovery of M. Becquerel, he had succeeded in preparing sensitive paper, on which the action of the light once operating, even in an imperceptible manner, it continues under the influence of certain agents for a long time after their exposure to the light, when they have been carefully kept in the dark. M. Talbot has even produced in the camera obscura images of objects, which have remained invisible for many months, and which he has afterwards caused to appear as if by magic. M. Talbot has not yet made public the mode of operating to produce these effects.

M. Beudan made a very favorable report of a memoir on crystallography by M. de Lafosse.

M. Morin read the supplement to a preceding memoir on the method of drawing carriages, and on their destructive effects on the roads.

An account was read by a foreigner of the "cure' of a deaf and dumb child by animal magnetism. It seems, however, to have been a cure in anticipation; for it did not appear that the magical influence of the fluid had yet caused the child to speak, nor was it clearly established that it could even hear; but it was concluded from the effect of the operation that it had given the infant the faculty of speaking in due course of time. Eight other cures were announced to have been effected by the same means.

A letter from M. Dieffenbach was read, in which he claims the merit of being the first discoverer of the mode of curing squinting by the sub-cutaneous division of the contracted muscle. Several papers on the subject of the cure of *strabism,* or squinting, by this plan of operating, have been lately presented to the Academy. M. Guerin, the Paris surgeon, who has operated on this plan most extensively, and was the first to introduce it in France, read a memoir to the society, in which he distinguishes two kinds of strabism. The one resulting from the contraction of the muscles; the other depending on an obstacle to vision in some point of the axis of the eye. This obstacle preventing the exercise of vision on one side, destroys the harmony of direction and movement; the eye which is so affected being obliged to turn to avoid the impediment. It is the strabism of the former kind alone that can be cured by the division of the muscles.

FRENCH CUSTOMS BILL.

The *Commerce* has the following remarks on the new Customs Bill:—"The most important parts of the bill are those respecting the admission of coal, machinery, thread, and linen. The object of the clause respecting foreign coal is to give the legislative sanction to the ordonnance of Nov. 1837, by which reductions in the duty were made. The towns of Nantes and Rouen have addressed petitions to the Chambers, praying for a further reduction. The object of this petition is opposed by the proprietors of coal-mines in France, who state that the importation of English coal, which was five years ago only a few hundred thousand metrical quintals, now amounts to more than three million quintals, and that if the duty be still further reduced, the importers of English coal will be able, with that saving, to transport their coal a greater distance, and thus compete with the proprietors of coal-mines in the interior. The question as to the introduction of machinery is at length about to undergo a solution highly favorable to maritime navigation. The present tariff imposes an *ad valorem* duty of 30 per cent. upon all steam-engines of foreign manufacture, without distinction, in favor of those which are not used in France, and are merely used for steamers between the ports of France and other countries. The ports have petitioned against this duty, and the Government, in accord with the committee on the bill, have recognised that foreign steam-engines, under these circumstances, should be exempted from duty. It is, however, proposed by the committee to grant a premium of 30 per cent. on the value of French engines employed on board vessels in inter-national navigation. This premium would comprise, at the same time, a

drawback on the raw *material*, and an encouragement for the constructors. The article respecting thread and manufactured goods of hemp and flax will give rise to the longest discussion. This question arises out of a revolution in manufactures, by which machinery has been substituted for manual labor. England, where this revolution had its birth, has availed herself of it to introduce everywhere, and principally into France, the thread made by machinery, and against which it is impossible for that made by hand to compete, either as regards price or quality. The importation of linen thread into France represents an annual sum of 25,000,000f. What is to be done? Shall we, as is proposed, increase the duty, and adopt a protective system? We have all the elements for making thread by machinery as cheaply as the English; for, if they have some advantages over us, we have others over them—such, for instance, as the lower price of labor, and the production of the raw material on our own soil. Cannot we imitate the English, and compete with them, without having recourse to an increase of duty? As this is proposed, the linen-manufacturers, in their turn, petition for relief; and, to satisfy them, it is proposed also to increase the duty on manufactured goods. There is, however, another important question, as to agriculture and commerce, connected with that of the duty on thread. If we receive English thread, it must be on the condition that England shall receive our brandy and wines. And what is become of the promised reduction of duties on these productions?"

The *Commerce* is in error in supposing that the manufacturers of thread in England are entirely indebted to foreign countries for their raw material. It is raised in abundance within Scotland and Ireland; and not long ago an important company was formed in Staffordshire for the cultivation of flax and hemp in that county. We may, however, also add, that it is only in the manufacture of thread of the finer description that high wages are paid. In the north of Ireland, where the commoner description of thread is made, the wages are quite as low as they can be in any part of France.

In the Chamber of Deputies on Monday, a discussion on that part of the French customs, duties relative to the importation of machinery and steam-engines took place. On the article of the tariff for imposing a duty of eight francs per kilogramme on the importation of needles, an amendment was proposed to reduce the duty to two francs, but it was rejected. The government proposition as to steam-engines was as follows:—"Steam-engines of more than 100 horse power on board French packets navigating periodically between French and foreign ports, 10 per cent. on the value, to be fixed by the committee of arts and manufactures."

The committee had proposed as an amendment:—"Steam-engines of foreign manufacture, of whatever force, employed in French vessels engaged in international navigation, shall be exempt from duty. Steam-engines of French manufacture, of whatever force, employed in international navigation, shall give a right to a premium of 33 per cent. upon the value in entrepot of similar engines of foreign manufacture; this value to be fixed by the committee of arts and manufactures." M. Pawels, proposed an engine maker:—"The duties payable in France on foreign machinery shall be levied according to the weight of metal employed. The duties on the importation of foreign iron, sheet iron, and copper, shall be reimbursed on the exportation of machinery made in France on the same basis. Machinery destined for international navigation shall be regarded as exported, and enjoy the same drawback." The hon. deputy stated that, in 1837, the real value of English machinery imported into France was 1,575,000 francs, but the declared value at the Custom-houses was only 871,000 francs. In 1839 the English machinery imported into France was worth in England 3,180,000 francs, but the declaration to the customs in France was only 1,683,000 francs. The question was adjourned till Tuesday, when the amendment which would have increased the protection of the French manufactuers, from 33 to 41 per cent., was rejected.

BELGIUM.

It is stated that M.Cleuysenaer, the architect, has for some time past been projecting the erection of a magnificent palace for the King, at Brussels, in the quartier Leopold. He is said to have found means to procure the funds for carrying his project into effect, and that the designs will be shortly made public.

The *Fanal* states that the Belgian Minister of Public Works is about to introduce the plan of a uniform system of postage into Belgium. One of the head clerks of the Post-office has been sent to England to see the working of the new plan. On his return it is expected that a similar arrangement, though with modifications, would be introduced into Belgium. The postage, it was supposed, would not be reduced so low as in England.

Messrs. Ghiesbreght, Linden, and Faulk, who have recently returned from a scientific expedition to Mexico, conducted at the public expense, have each received a gold medal, on which is the effigy of King Leopold, as a mark of his satisfaction with their labors.

A great number of dark spots have been recently observed on the sun's disc. They have been noticed by Mr. Foster, an English astronomer residing at Brussels, who, in the winter of 1837-38, was the first to announce the presence of a great number of similar spots on the sun.

The return of the frost has been experienced in Belgium as severely as on its first appearance. The canals have been stopped, and the navigation has been interrupted in almost every part.

HYDRAULIC LIMESTONES IN BELGIUM.

We recently inserted from a Belgian paper an article on the manufacture of water cements. On this subject a correspondent of the *Emancipation* sends to the editor of that paper the following communication.

"You have inserted in your number of the 30th of Dec. last, an article on the manufacture of water cements, the object of which seems to have been principally to draw the attention of masters of quarries to the possibility of manufacturing artificial hydraulic limestone.

"With submission to science which throws light on this interesting subject, and to the talents of the author of this article, there are some observations to be made on the establishment of such a manufacture, in a country where hydraulic limestones are in such great abundance, for without alluding to the limestones of Tournay, so well known, which by the means of the Scheldt, and its numerous ramifications of rivers and canals, could easily be conveyed at very moderate expense into the two Flanders, Brabant, the province of Antwerp, and a part of Hainault, there exists likewise many other quarries in Belgium. Sombreffe, Heppegnies, Viesville, and Shimeon produce hydraulic limestones of excellent quality, which are even perhaps superior to the hydraulic limestones of Tournay, for building and for works exposed to the damp. Artificial hydraulic limestones can only be obtained at very great expense, about from 40 to 45 frs. a cubic metre, valued on the spot, on account of the great expense attendant on the removal.

"In matters of business, it is not only good materials that are required: a good market is wanted also, and public patronage is wanted more than either. What chances of success would there be for a manufacture at Brussels, where, even if the limestones were superior to those of Tournay and Shimeon, the latter could be obtained at a third or a quarter of the price? It would be better if the directions of Government, excluding no locality, would be satisfied with stipulating, when the opportunity for doing so occurred, that the limestones used must be hydraulic, without mentioning from what place. Thus the beautiful subterranean gallery of Camptich, the works of the canal of Charleroy, from Brussels, as far as Hal, the sluices of the Sambre, the bridges and viaducts on the railroad to the south, the new branch commenced at Namur, and a number of other important works, are executed with the limestones of Viesville and Shimeon; while the subterranean gallery of Braine-le-Compte is finished with hydraulic limestones, recently discovered, from Chaudfontaine. Thus the whole of Belgium being abundantly furnished with hydraulic limestones, Luxemburgh will, perhaps, be the only place able to make use of this manufactured artificial material with advantage.

ON THE FOUL AIR IN THE CHALK AND STRATA ABOVE THE CHALK NEAR LONDON.

In the last part of the proceedings of the Geological Society of London, the following communication appears by Dr. James Mitchell, which, on account of its interest, we extract:—

In the chalk, the most abundant deleterious gas is the carbonic acid, but it has been found to exist in greater quantity in the *lower* than in the *upper* portion of the formation, and in that division to be unequally distributed. In sinking wells it has been noticed to issue with force from one stratum, whilst none has been perceived to be given out from the beds immediately above and below it. Dr. Mitchell mentions fatal effects owing to its occurrence in a well near the race-course at Epsom, where it was met with at the depth of 200 feet; and in Norbury Park, near Dorking, at the depth of 400 feet. On Bexley Heath, after sinking through 140 feet of gravel and sand, and 30 feet of chalk, it rushed out and extinguished the candles of the workmen; and in making a well in Long Lane, Bexley Heath, after penetrating 124 feet of overlying deposits, and then 90 feet of chalk, considerable inconvenience was felt from it, but six feet lower no gas was emitted.

In chalk, *sulphuretted hydrogen gas* is also occasionally met with, and is supposed to be generated from the decomposition of water and iron pyrites.

In districts in which the chalk is covered with sand and London clay, *carburetted hydrogen gas* is sometimes emitted, but more frequently *sulphuretted hydrogen gas*.

Carburetted hydrogen has seldom inflamed in wells, but in making the Thames Tunnel, it has sometimes issued in such abundance as to explode by the lights and scorch the workmen.

Sulphuretted hydrogen gas is more abundant, and it has been observed almost always to proceed from a coarse black sand, charged with oxide of iron, whether the bed be above the blue clay, within it, or below it. It has streamed out with great violence in the Thames Tunnel, but has in no instance produced fatal effects. At Ash, three miles from Farnham, a well was dug in sand to the depth of 36 feet, and one of the workmen on descending into it was instantly suffocated. Fatal effects have also resulted from the accumulation of this gas in wells in Maiden Lane, Battle Bridge, and at Aplexburg Street, near Cheshunt. This gas is much increased, after long continued rain, in consequence of the swelling of the clay driving it out of the interstices; and it is diminished after a long drought. The prevalence of a north-east wind has been noticed by well-diggers to diminish the quantity of the gas, but the effect is ascribed by Dr. Mitchell to the dry weather, which accompanies the wind from that quarter. The author also suggests, that if wells are to be dug in dangerous districts,

they should be undertaken *when there is least water in the ground*, or from the beginning of July to October.

The noxious gas in the weald of Kent and Sussex is stated to be *sulphuretted hydrogen*.

SCIENTIFIC MEMORANDA, AND NOTES ON ART.

Head of the Laocoon.—A Lyons journal publishes the following letter from M. Valmore, an artist at Brussels:—"In the gallery of the Duke d'Aremberg there are many things which are not known to any but the initiated. Among them is the original head of the Laocoon. This fine group, when first discovered in Italy, was without the head of the father, and an arm of one of the sons. The head was supplied by a celebrated artist, who copied it from an antique bas relief. Some time afterwards the original was found by some Venetian connoisseurs, and was ultimately sold to the grandfather of the Prince for about 160,000f., and brought to Brussels. When Napoleon, during the Consulate, had the group transported into France, he knew that the real head was in the possession of the Duke, and offered him its weight in gold for it. This was refused, and as it was known that Napoleon was not scrupulous in gratifying his desires, the Duke d'Aremberg sent this *chef d'œuvre* to Dresden, where it remained concealed for ten years, but was brought back again into Brussels when Belgium became tranquil. It expresses in the highest and most admirable degree, moral grief mingled with physical pain. The compression of the teeth and the contraction of the under jaw are almost too horrifying to be long contemplated, and yet, in this intense expression of suffering, there is not the slightest grimace. The pupils of the eyes are so exquisitely executed, that they actually seem to flash from the marble. A cast from the head now on the statue is placed by the side of the original, and the vast difference between the two is at once evident."—*Galignani's Messenger.*

Sham New Editions of Scientific Works.—Mr. London, the celebrated horticulturist, makes the following suggestion in a letter to the Editor of the *Morning Chronicle.* "Though Mr. Sergeant Talfourd has lost his (copyright) bill, he may yet introduce another, which, as I think, will be useful both to the public and to authors. This is an act to render it imperative on publishers not to allow the true date of the title-page and preface of any scientific work to be altered, except where alterations are made in the body of the volume. Publishers should also be obliged, when a work is stereotyped, to introduce that word, and the year in which the plates were cast, in the title-page; and not to alter that date till a genuine new edition was produced. The effect of these regulations would be to prevent old works on sciences which are undergoing improvements every day, from being given to the public as new editions containing all the latest improvements. This would be a manifest advantage to the public, while the frequency of really new editions would bring some little remuneration to the author who is now often doomed to see his works selling extensively, on the credit of his name, and passing through several nominal editions from the old stereotype plates, not only without his deriving the slightest advantage from them, but with the certainty that he will be blamed for errors and omissions which he sees, but has no power to correct or supply."

Royal Institute of British Architects.—At the ordinary meeting held on Monday evening last, Mr. Edward Blore took the chair. Mr. Hay's work on "Cairo" was presented, and led to some interesting remarks on the architecture of that city by Mr. George Alexander. There seems to be a variety of styles discoverable there, especially the Moorish, the Turkish, and a sort of Elizabethan or mongrel Italian. A beautiful sectional drawing made by Mr. Bonomi, of St. Paul's within St. Peter's, showing their relative sizes, was exhibited by Mr. Scoles. Relative to the former of these buildings, Mr. George Goodwin mentioned the present dilapidated state of the model of Wren's original design, made by order of King Charles the Second, and which is now kept in the cathedral. Unless steps be taken for its repair, it will speedily be destroyed. Some remarks by Mr. Nicholson, and also by Mr. Papworth, on the curious arch between the western towers at Lincoln cathedral, commonly known as the stone beam, were read, and led to discussion. The object of this arch is still a problem to be solved. A paper was then read by Mr. Ambrose Poynter on the construction of observatories; in buildings of this nature, the great aim is to afford protection to the instruments, without interfering with their freedom of motion.

The Eclipse of the Moon.—The lunar eclipse which occurred at an early hour on Saturday morning, the 6th inst., lost a considerable degree of its interest, in consequence of the hazy state of the weather, which prevailed during the greater part of the progress of this phenomenon, no doubt to the great disappointment of astronomers. At about the period, however, of the middle of the eclipse, 2h. 6m., the mist was somewhat dispelled by the wind (which blew almost a gale from the eastward at the time), and the heavens became sufficiently clear for the observer to distinguish Regulus, Procyon, Pollux, Castor, and various others of the noted stars, which shone for a time with considerable brilliancy. The eclipse ended at 3h. 52m.

Earthquake at Messina.—A letter from Messina, in giving an account of the recent earthquake there, says that little or no damage was done to the city, though from the frequency of the shocks, great apprehensions had been entertained. The weather was fine, and the sea calm at the time. The direction of the shocks was from N.E. to S.W., showing that it was the same force which acted at Reggio, in Calabria, and did not come from Mount Etna. The earthquake was not felt farther south than Taormina, nor than Milazzo to the west; but the Lipari Islands experienced a slight commotion, as well as all that part of the Sicilian coast between Milazzo and Cape Faro. The population of Reggio continued encamped in the open country round the town.

Fatal Land Slip.—A letter from Naples of the 25th ult., states that on the night of the 22d, a considerable slip took place on the mountain above Gragnano, near Castellamare, and that sixty houses were crushed by the falling matter. It is supposed that one hundred persons perished by this sudden calamity. The news of it having reached the King next morning, his Majesty immediately set off with the Minister of the Interior and Police for the scene of the disaster, and sent four hundred pioneers there as rapidly as possible. The presence of his Majesty gave spirits to the workmen, who had been collected by the local authorities for removing the ruin and rubbish, and by the following day thirty-three corpses and five living persons had been extricated. The cold was great at Naples; all the hills, and Vesuvius especially, were covered with snow, up to the crater, from whence a thick volume of smoke continued to issue.

The Statute of Mr. Wilberforce.—The statute of the late benevolent William Wilberforce, which was exhibited to the public in the collection of statutes and busts at the exhibition of the Royal Academy last summer, has been placed in Westminster Abbey, and now forms one of the ornaments of that cathedral. The statute is by Mr. S. Joseph, an artist of very considerable talent.

VARIETIES.

Exportation of British Machinery.—A correspondent of the *Times* suggests the propriety of a return being made to Parliament of all the articles of British machinery exported during the last seven years, which returns, he observes, "are imperatively called for, in order that the Legislature may arrive at a sound and correct conclusion as to the policy and propriety of giving other nations the immense advantage of copying the unparalleled invention and great superiority of British machinery; it is the exposition of our machinery that has caused the rapid extension of cotton and woollen manufactories in the United States, France, Germany, Belgium, Switzerland, and other countries. Our hitherto great commercial pre-eminence is solely to be attributed to the prodigious facility given to our manufactures by our superior invention and excellent machinery, which has enabled us to compete with foreigners, notwithstanding they possess the advantages of cheaper food, lower wages, and fewer taxes."

Irregular Arrivals of Railway Trains.—A correspondent of the Morning Chronicle, who signs himself "a manufacturer," complains of the great inconvenience the passengers on the North Midland and Midland Counties Railways are subjected to by the irregularity of the mail train at Rugby. He thus mentions his own experience of the fact: "On Tuesday evening last, I was a passenger, with fifteen or twenty others, and upon our arrival at Rugby, at twenty minutes past three in the morning, we were told that we could not proceed to town until the next train from Birmingham came up, which would not arrive until twenty minutes past eight. Of course we alighted, but no accommodation was offered; part of the number proceeded to Rugby, upwards of a mile from the station, when they had to seek shelter in the best manner possible, and were informed that a similar stoppage had occurred five times previously. The fact of our being temporarily annoyed during the five hours' stay in the middle of the night, sinks into insignificance when it is considered that the non-delivery of letters might prove highly prejudicial to persons engaged in commerce (as was the case some ten or twelve days since, when, in consequence of the letters from Leeds, Leicester, &c., not being delivered until after banking hours, several bills of exchange were dishonored), independently of all the other evils connected with such neglect."

Fire caused by Hot-water Apparatus.—The extensive warehouses of Messrs. Crafts and Stell, Manchester, American merchants, were destroyed by fire on Monday morning, owing to the explosion of the hot water apparatus used in warming the premises. There were furnaces at different ends of the warehouse for heating the water, which had been lighted soon after six o'clock. In about an hour after, the porter heard a loud report, resembling that of a cannon, in the cellar. He immediately hastened thither and then found, that the end of the hot water pipes resting in that furnace from which the ware-rooms were warmed, had burst, and in the explosion had scattered the burning coals and cinders in the furnace all over the cellar, which contained a considerable quantity of grey goods. These caught fire, and were burning when the man entered the cellar; and he immediately attempted to extinguish the flames, but they spread so rapidly, that he was speedily obliged to desist; and he escaped with some difficulty, and in less than ten minutes afterwards, the fire had found its way up the well holes, and burst out at the top of the warehouse. The *Manchester Guardian* gives the following explanation of the cause of the explosion; "it is tolerably well known that the water which circulates through pipes, for the purpose of communicating heat, is subjected to the powerful action of a furnace, through the middle of which it passes within a coiled pipe, or in some other way which exposes it to a very high temperature. So long, however, as the pipes remain unobstructed, the water circulates through them so rapidly, that the portion which is exposed to the direct action of the fire is quickly removed from its influence, and the place supplied by an uninterrupted current of comparatively cold water, whereby the generation of highly-explosive steam is prevented. But when, from any cause, the circulation of the water is stopped, the portion exposed to the action of the furnace cannot readily escape from it, and steam of a very high pressure is inevitably generated. There seems to be no doubt that, in this case, the water in the pipes had been frozen to a considerable extent, by the intense cold which prevailed from Saturday night to Monday morning, during which time, of course, the apparatus was not used. The ice thus formed in the pipes would effectually prevent the circulation of the water when the furnace was lighted, and thereby bring on the catastrophe which ensued. It may at first sight be considered somewhat remarkable, that no such accidents occurred during the intense frost a few weeks ago, when the temperature was certainly much lower than it has recently been; but we believe it will be found, that the former frost did not extend over a Sunday, and consequently there was not time for the water to become frozen."

The Dublin Mail Steamers.—The strong easterly winds which have prevailed during the last few days, caused these fine boats to make very long passages from Dublin to Liverpool. The mail which was due at six o'clock on Saturday morning, did not reach the Post-office until nine at night; and that due at eleven on Saturday forenoon did not arrive until yesterday at noon, twenty-five hours beyond its usual time of arrival. The mail due yesterday morning arrived at five o'clock in the evening.

The Danube.—We learn from Ratisbon that the Danube has been greatly flooded there, and that its course having been partially stopped by the accumulation of blocks of ice, it has formed for itself a new channel near the village of Demling, and now runs between Frankofen and Kruckenberg.

Death from the Scratch of a Pin.—On Tuesday, an elderly man named Peter Buse, expired in the London Hospital, under the following singular circumstances:—A few weeks since, he accidentally scratched his left hand with a pin, and took no notice of the circumstance. Instead of the puncture healing, it gradually extended, and his arm became swollen to about twice its usual size. He went to the London Hospital, and on the wound being examined, it was found to be in a very inflamed state, and it was very evident that it had been poisoned. Everything was done to save the poor man's life, but mortification ensued, and after enduring much pain, death came to his relief.

Privy Council.—The Judicial Committee of the Privy Council resumed their sittings on Thursday, the 11th inst., to hear petitions for prolongations of patent and colonial appeals. In the matter of Woodcroft's patent, which came before their Lordships for an extension of the term, Lord Brougham, on the part of their Lordships, gave judgment that sufficient proof of merit and acting under the patent had not been shown, to entitle the parties under the act.

Diminution of Value of Turnpike Trusts.—The toll-bar on the Great North-road, a mile south of Stamford, was let by the trustees of the turnpike 10 years ago for the sum of £1,720 for one year. Last week the same bar was let for a year for £755; the difference being £965.

SAFETY ROTATION RAILWAY.

MR. RANGELEY, having obtained patents for his new invention, is now prepared to grant licences to Companies to use the same. Mr. Rangeley begs to state that the principle of his Railway combines economy, with perfect safety in travelling by stationary engines, at thirty, or more miles per hour.

Models and drawings may be seen at the Patentee's office, No. 1, Walbrook-buildings, Walbrook, near the Mansion-house, London.

October, 1840.

GRAY'S-INN WINE ESTABLISHMENT.—The Attention of the Public is directed to the undermentioned WINES and SPIRITS, which are strongly recommended for general consumption:—

	per doz.
Port, from the wood	30s.
Ditto ditto, 4 years in bottle	42s.
Sherry, excellent dinner wine	30s.
Ditto, superior old	42s.
Masdeu, from the wood	28s.
Old Crusted ditto	36s.
Marsala, best quality	24s.
Cape ditto	18s.
	per gal.
Cognac Brandy	28s.
Rum	14s.
English Gin	8s. and 12s.

23, High Holborn. HENEKEY, KISLINGBURY, & CO.

P.S.—Price-currents, containing all the varieties of their stock, forwarded upon application.

SHERRY.—The most various and most curious of the SHERRIES shipped in the Bay of Cadiz are to be met with at the Gray's-inn Wine Establishment, and offer a rich treat to the connoisseur in really pure and virgin wine. The pale dinner Sherry, at £68 per butt, or £17 10s. per quarter cask: and the old, soft, high-flavoured wine, at £84 per butt, or £21 10s. per quarter cask, are particularly recommended.

HENEKEY, KISLINGBURY, and Co.

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ACTS OF PARLIAMENT.

PATTERNS,—
27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17. (The last relates to patterns and *models*.)

PATENTS FOR INVENTIONS,—
2 and 3 Victoria, c. 67.

SCULPTURES,—
38 Geo. III., c. 71.

ENGRAVINGS,—
7 Geo. III., c., 38; 17 Geo. III., c. 57.

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8 Anne, c. 19: 12 Geo. II., (Booksellers' Act), c. 36; 5 Geo. III. (Universities' Act) c. 53; 54 Geo. III. (General Copyright), c. 156.

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AND JOURNAL OF INDUSTRY;

A WEEKLY BRITISH AND FOREIGN MISCELLANY OF SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

No. 82.] SATURDAY, FEBRUARY 20, 1841. [PRICE FIVEPENCE STAMPED. CIRCULATING FREE BY POST.

MR. WHISHAW'S RAILWAY EXPERIMENTS.

A considerable portion of Mr. Whishaw's recently published work on tho Railways of Great Britain and Ireland, is occupied with a record of numerous experiments on some of the most important lines of railway. These experiments are properly termed "practical," because they represent the actual performances of the engines with their loads in the regular course of traffic, and are not merely observations made on a short distance of any given line. The general results of these experiments, which we published in a recent number of our journal, are, at first sight, startling to those railway companies who have spent hundreds of thousands in levelling their roads to obtain first-class gradients; for it would appear that with second, and even with third-class gradients, a greater average speed may be obtained than on the almost level lines. We endeavored to show, in an article accompanying the extract from the work we then gave, that on all lines of great traffic a level way must in any circumstances be preferable to an undulating one; a more close examination of the experiments has confirmed this opinion.

The average speed attained on the London and Birmingham railway, which has first class gradients throughout, from the Camden-town station, is particularly compared with that on the Grand Junction, the Newcastle and Carlisle, the North Union, and the Stockton and Darlington railways, which have second-class gradients, and some of the highest degree. To attain the average speed on these second-class gradient lines, however, the velocity down the inclines is necessarily very great, and the speed up-hill is proportionally diminished. But this is not all the disadvantage of the system. The average of the loads conveyed, in the cases compared, has been overlooked by Mr. Whishaw in stating the general results, though the weight of each load is particularly given in the details of the experiments. When the loads conveyed are taken into consideration, the result is far from favorable to the second-class gradients. It appears, from a comparison of the tabular statements, that the average of the loads in the twenty-eight experiments on the London and Birmingham line, with single engines, was upwards of 79,000 lbs., and the average speed attained was, in round numbers, twenty-four miles and a half per hour. On the Newcastle and Carlisle and the North Union railways, the loads averaged only 45,000 lbs., and on the Stockton and Darlington railway the average of the loads during six experiments did not exceed 32,800 lbs. Tho engines on these lines and those of the London and Birmingham are of almost the same power. On the Grand Junction railway, tho loads more nearly approached the weight of those during the experiments on the London and Birmingham. The average of the loads was 75,000 lbs.; the average of speed nearly twenty-six miles and a quarter per hour; but the engines are much more powerful than those on the London and Birmingham line, the cylinders being thirteen inches diameter instead of twelve, with the same length of stroke.

It appears, therefore, that when the relative weights conveyed and the powers of the engines are taken into consideration, the advantage greatly preponderates in favor of the more level line. It is evident, that, unless these particulars are stated, the mere results as to the rate of speed may lead to very fallacious conclusions. It would have been much more satisfactory, if in every case we had known the quantity of fuel consumed; for after all, in questions of relative cheapness, the consumption of fuel, as an index of the power employed to produce any given effect, is an essential part of the calculation.

There is this great disadvantage attending experiments on different lines of railway and with different engines, that they must be always liable to be affected by accidental circumstances, which prevent the results from being relied on as general rules. The different states of the weather, and the condition of the roads, may very materially alter the velocity with which the engine can propel its load; and unless the pressure of the steam be stated, as well as the velocity, the data are very uncertain. We observe, for instance, that in some few of Mr. Whishaw's practical experiments, the greatest velocity attained during the journey was in ascending the steepest inclines, though in general the reverse occurs. Instances of this kind show, that without the most minute particulars being stated, no satisfactory inference can be drawn. It must be evident that to attain a high velocity in ascending a hill a greater power must be exerted, and that the pressure of the steam in the boiler must have been greatly increased to produce such an effect. It is stated, as the result of experiments made by other engineers to ascertain the additional power required to ascend inclines, that an engine, which on a level will draw twenty tons at a velocity of eighteen miles an hour, will only draw half that load up an incline of 1 in 250; yet in one of Mr. Whishaw's experiments, on the North Union railway, we find the load was pulled up an incline of 1 in 100 at a velocity of twenty-seven miles an hour.

We endeavored to show in a former article,* that theoretically there would be a great saving of resistance from friction by increasing the rapidity of tho motion on a level railway; but in ascending an incline the power must necessarily be increased with the velocity, because the faster the engine moves in a given time, the higher it has to lift the whole load in the same time. If, therefore, hills are to be ascended by locomotive-engines at a rapid velocity, they must be made capable of exerting more power during the time of ascent, either by increasing the pressure of the steam, or by enlarging the size of the cylinders, working the steam expansively on descents, and on other parts of the line.

We have thought it necessary to make these observations on the results of Mr. Whishaw's experiments, because, unless closely examined, they are calculated to mislead, and to induce the belief that railways with steep inclines are as advantageous as level planes. This they can never be; because the average speed can only be maintained by irregular velocities; and high velocities on declivities must always be accompanied with danger. The aggregate resistances of the air would also be increased by irregular speeds, for the ratio of resistance increases with the increase of velocity. Though we are thus induced to prefer the level way to the undulating, in the abstract, there are numerous instances in which the plan of undulating railways may be advantageously adopted. The main lines of communication in England have been already nearly completed; but unless some cheaper method of extending the system of railways be adopted, the greater part of the country must be deprived of the important advantage. It is at this time, therefore, that Mr. Whishaw's experiments become important, as showing the capability of ascending steep inclines even with

* Inventors' Advocate, No. 69.

the present locomotive engines. These ascents must, indeed, be attended with additional cost in the working of the lines; but where the traffic is comparatively small the expense of laying down the road is tho greatest drawback, and the cost of tho extra fuel will bear no proportion to the interest of money sunk in constructing level railways. The plan of working with single lines, also proposed by Mr. Whishaw, deserves serious consideration; and though the reciprocating method of carrying on the traffic, which he proposes, appears open to many objections, we feel assured that a single line of rails, in all cross-country communications, would be found effectual and safe, if conducted with the accompaniment of an electro-magnetic telegraph, to announce the arrivals and departures of the trains at each station, so as to prevent trains from starting in opposite directions between any two stations. Mr. Whishaw shows, by detailed calculations, that a firm and well-constructed railway on this principle can be made, and furnished with engines, &c., at an average expense of £15,000 per mile. If this can be done, and the calculations seem to be made on a liberal scale, Mr. Whishaw will have rendered great service to the country, by pointing out the method of establishing a comparatively cheap means of extending the ramifications of the railway system.

POLITICAL INFLUENCE OF RAILROADS.

We translate the following observations, relative to the political and commercial importance of railroads in general, but more particularly of that between the Sambre and Meuse, from the *Courrier Belge.* The strong spirit of animosity to England which pervades the article, is, we are sorry to observe, participated in by several other continental papers, which profess to advocate the cause of manufacturing industry. The great supremacy which this country has attained in manufactures, and her improved facilities of communication by railways and steam-boats, naturally excite the jealousy of rival manufacturing states. We regret this feeling should exist, but it is well to keep in view the spirit which stimulates the manufacturers abroad, so that by continuing the progress of manufacturing improvement and internal communication, we may be enabled to maintain at least our present position in advance, from which such efforts are making to remove us:—

"The road from Charleroy to the Meuse, like all the great lines of railway, ought, in its results, to be considered under three different points of view: the political and European, the national, and the local or private. When an undertaking succeeds and equals tho expectation of the nation or of private individuals, it does not require to be justified financially; it produces what is immediately required, that is, it pays interest for the money spent in working, and for the original outlay. The expense with which it is attended in the first instance is yearly reimbursed by the profits; there is then no occasion to descant on the utility of such undertakings. They may be commenced immediately; the time lost is a robbery committed on the present generation, and is frequently the cause of injury to generations to come.

"Numerous and very able estimates have been made to prove that local interest would be sufficient to defray the expenses of the railway between the Sambre and tho Meuse. Political interest is, in Europe, that which occasions the greatest and most useless expense, because it is not repaid by the profits. About two thirds of each budget are absorbed by the expenses connected with the furtherance of political objects.

"The army, ambassadors, the interest of loans, private funds, &c. &c., consume enormous capitals every year, and all without any animadversion; it is considered as a thing of course; that they are indispensably necessary; what millions are swallowed up in this unfathomable abyss! And yet railroads have and will continue to possess incalculable political influence, greater perhaps than that of the most important treaties; greater than that of diplomatic protocols; for a scratch of a pen cannot, in their case, destroy all that has been done.

"We believe the European balance of power, so much boasted of, is nothing but a diplomatic fiction invented by England for her own advantage. In fact, if England did not exist, and the relative situations of parties were to continue as they are at present, all the continental powers would not fail to act together and to maintain a good understanding; but if Great Britain puts her foot in the balance, it instantly turns; she induces nations to become restless, and to fly to arms; the equilibrium is destroyed; peace is endangered; commerce is brought to a crisis; manufactures become involved; in short, all the sources that invigorate nations are troubled, and threaten to become exhausted.

"A recent example proves the truth of our assertions. It ought, therefore, to be the object of the continental nations to render themselves independent of English influence; they ought to establish a balance of power to enter into competition with England; when, being no longer subjected to the influence of British interests, the continental nations may anticipate a long peace, and a prominent share in the general prosperity.

"A universal system of rapid communication, by bringing the continental powers into immediate connection, will tend to accomplish this object more directly than the most formidable armies, or the best garrisoned fortresses. A combined tariff of prohibitive duties will operate as an immediate check on England; the treaty of commerce between Holland and France had no small share in the decisions of the cabinet of St. James's.

"Railroads must then occasion a great alteration in the politics of Europe. If those in France from Paris to Lille, to Strasburg, to Orleans, to Havre, had been finished, there would have been no necessity for surrounding the capital with walls. This combination of lines would have furnished an army to repulse the enemy in every direction; fresh battalions in readiness to surprise their wearied troops. The public treasure, increased by these means, would have been sufficient for all the casualties of war and every national exigency.

"Doubtless the companies which have been organised for the purpose of constructing these important roads of communication have not always had in view their political results; they have merely considered private interests; but it is the duty of political men, of those who are especially devoted to the general interests of the people, to favor every thing which tends towards the great object, that of releasing the nation from the yoke of England.

"The road between the Sambre and Meuse, as much, and perhaps more than any other, will fulfil the great continental and national objects to which we have just alluded. Situated on the line which forms a direct communication between Antwerp and Metz, Strasburg, all the east of France and Switzerland, it will be the means of carrying into effect the commercial treaty between France and Holland. With respect to colonial supplies, it places us in a better position than Amsterdam and Rotterdam; for winter, extensive floods, and droughts, sometimes obstruct navigation, or render it more tardy; but locomotives overcome all obstacles with regularity and rapidity. In less than thirty six or forty hours at farthest, travellers, cotton, colonial, and other goods, may be conveyed from Antwerp to the frontiers of Switzerland, whilst it requires many days, perhaps weeks, to transport them thither by water. Thus Antwerp would, by a sudden leap, be placed in the position of Rotterdam. Ships, after long voyages, finding there a certain market for their goods, will forget the passage to London and Liverpool, to disembark their merchandise at Antwerp, and take back with them what they would have found in England,—printed calicoes, linen, cloth, iron and copper goods, glasses, &c., &c., which we should be able to manufacture equally as cheap as our competitors across the Channel, if, like them, we were united by exchanges and railroads. What we have advanced here are not Eutopian notions, but realities. Wherefore do large vessels avoid the port of Antwerp? Is it because it is inconvenient, unsafe, or dangerous? No, certainly not; but because they are not sure of meeting with accommodation for all their merchandise; they therefore give the preference to London and Liverpool; it is to these places that our coasting vessels resort in small detachments to furnish us with necessaries. Thus it is that England, our rival in manufactures, compels us also to be her tributary in commerce."

ADVANTAGE OF STEAM BOATS IN NAVAL WARFARE.

We were the first to point out the advantages in which this country would be placed in case of war, by the possession of a numerous fleet of large steam packets, which might in a short time be fitted as vessels of war. The importance of such a plan was recognised in the French Chambers, when it was determined to build the Trans-Atlantic steam packets in such a manner as to adopt them readily as men of war. The following article on the same subject, which we translate from a French paper, shows that the recent events on the coast of Syria have given additional impetus to the desire of France to establish a fleet of steam ships, and to repair as much as possible the deficiency of steam vessels in her naval departments, either as acting ships of war, or as towing boats for larger ships.

"Since the age of Louis XIV., the navy has been considered in France as only a secondary force. Napoleon did not appreciate the qualities of the naval force; and the glorious but fatal battles of Aboukir and Trafalgar appear for a time to have corroborated his opinion. It was not then understood that our disasters were attributable to new and bold tactics, invented by the Napoleon of the seas, and executed so cleverly that our admirals, who adopted the old system, remained as inferior to Nelson, as the generals of Russia and Germany were inferior to General Buonaparte. During the time of the empire, the dominion of the seas was abandoned to the English admiral. The decline of the navy may be dated from that time, yet we are now beginning to think differently. The expedition of Spain in 1823, the conquest of Algiers which immediately succeeded the battle of Navarino, the battle of Lisbon, the capture of St. Jean d'Ulloa, and more lately the exploits of the English in Syria,—in short, the cultivation of the naval power by all maritime states, appears to have made some impression on the mind of the French Ministers and Deputies. They begin to estimate the advantage that a naval force possesses in a country where half of the frontiers are situated on the ocean and the Mediterranean, and which has colonies in those seas; and we expect a reaction favorable to the French navy.

"The power of steam has effected an entire revolution in naval tactics, and that nation which possesses the greatest number of packet boats will always be sovereign of the seas. England has hastened to claim the ascendancy, and while France

remains stationary with her vessels of from 160 to 220 horse power, her neighbours over the water have already a great number of steam frigates of 500 horse power, and are making every exertion to increase that number. In these circumstances a serious responsibility rests with the Ministers and Deputies of France. Perhaps it would be much better to spend some millions less in the fortifications of the interior, and appropriate some millions more to the building of packet boats and steam engines.

"We have lately alluded to a new plan of naval tactics entrusted to the management of Rear-Admiral Laiué, for the navigation of steam vessels. We now learn that some additional officers have been appointed to expedite this undertaking, which is anxiously expected.

"The revolution that will be produced in the art of naval warfare, by steam vessels, will soon be accomplished. The facility with which a squadron of these ships can break through the line of the enemy; the effects that may be expected from them when used as fire ships, in order to burn the squadrons in the ports, or when the vessels are becalmed at sea, the steam-boats being able to attack them so as to avoid their cannon; the probability of their being able to approach forts and to destroy them, in some cases, with their terrible Paixhan cannon, has suggested the necessity and urgency of regulating their action, so as to render their attacks more efficacious, and to organize new plans of battle, it being impossible on the present system to preserve regular lines.

"The result of the undertaking to which M. Lainé has devoted himself, cannot be definitely ascertained till the correctness and value of the plans are sanctioned by experience. It is desirable immediately to form a squadron of steam vessels; and to make trial of them in all weathers and under all circumstances, alternately extinguishing one or many of the fires, and ascertaining the saving in the consumption of fuel by sometimes making use only of sails, &c. All the resources that this new mode of navigation possesses must then be tried separately; a navigation which ought to secure to France the position and preponderance that should never have been lost.

"But to effect this, packet boats are first necessary, and we possess a very small number. Large engines are wanted, and we have no manufactories where such engines can be made. We think, then, that it would be a wise determination on the part of Government to purchase, without delay, either in England or the United States, ten large steam frigates of 500 horse power, fitted for commercial traffic; and that the Chambers should also open a credit of ten millions of francs to the minister for these purchases; and of ten millions, to found at Toulon and Iudret two large manufactories of steam engines, with a recommendation that they may be finished in less than a year."

THE THEORIES OF SHOOTING-STARS.

At a recent meeting of the Astronomical Society, a paper was read by Mr. Galloway on the present state of our knowledge respecting shooting stars, in which the different theories which have been propounded, to explain their origin and phenomena, were stated. Of these, the following are the principal:—

1. That the shooting-stars and fire-balls are substances projected from volcanoes in the moon. It is known that a body projected vertically from the moon with a velocity of about 8,500 feet in a second would not fall back upon the lunar surface, but would recede from it indefinitely; and in order to reach the earth the projectile would only require, under the most favourable circumstances, to have a velocity of about 8,300 feet. Such a velocity, which is only about four or five times greater than that of a cannon-ball, is quite conceivable; but the extraordinary exhibitions of 1799 and 1833, to say nothing of their supposed periodicity, is utterly irreconcilable with the theory of a lunar origin. Benzenberg, however, adopts this theory, and supposes the shooting-stars to be small masses of stone, from one to five feet in diameter, which are projected from lunar volcanoes, and circulate about the earth or about the sun when their projectile velocity exceeds a certain limit.

2. Dr. Olbers, and some other astronomers, have supposed the shooting-stars to be the *débris*, or fragments, of a large planet, burst into pieces by some internal explosion, of which *Ceres*, *Pallas*, *Juno*, and *Vesta*, are the principal remaining portions. The smaller fragments continue to circulate about the sun in orbits of great eccentricity, and when they approach the region of space through which the earth is moving, they enter the atmosphere with great velocity, and by reason of the resistance and friction are rendered incandescent, and emit a vivid light so long as they remain within it.

3. It has been suggested by Biot that the extraordinary displays observed in November may be explained by supposing the meteors to have their origin in the zodiacal light. The extent of this lens-shaped nebulosity is not well ascertained; but as the plane of its principal section is not parallel to the ecliptic, if the earth passes through it at one season, it must be remote from it at another. But shooting-stars are observed at all times of the year; and the November meteors differ from those of other seasons in no respect excepting in their greater multitude.

4. The hypothesis first suggested by Chladni is that which appears to have met with most favour, having been adopted by Arago and other eminent astronomers of the present day, to explain the November phenomena. It consists in supposing that, independently of the great planets, there exist in planetary regions myriads of small bodies which circulate about the sun, generally in groups or zones, and that one of these zones intersects the ecliptic about the place through which the earth passes in November. The principal difficulties attending this theory are the following:—First, that bodies moving in groups in the circumstances supposed must necessarily move in the same direction, and consequently, when they become visible from the earth, would all appear to emanate from one point, and move towards the opposite. Now, although the observations seem to show that the predominating direction is from north-east to south-west, yet shooting-stars are observed on the same nights to emanate from all points of the heavens, and to move in all possible directions. Secondly, their average velocity (especially as determined by Wartmann) greatly exceeds that which any body circulating about the sun can have at the distance of the earth. Thirdly, from their appearance, and the luminous train which they generally leave behind them, and which often remains visible for several seconds, sometimes for whole minutes, and also from their being situated within the earth's shadow, and at heights far exceeding those at which the atmosphere can be supposed capable of supporting combustion, it is manifest that their light is not reflected from the sun; they must therefore be self-luminous, which is contrary to every analogy of the solar system. Fourthly, if masses of solid matter approach so near the earth as many of the shooting-stars do, some of them would inevitably be attracted to it; but of the thousands of shooting-stars which have been observed, there is no authenticated instance of any one having actually reached the earth. Fifthly, instead of the meteors being attracted to the earth, some of them are observed actually to rise upwards, and to describe orbits which are convex towards the earth; a circumstance of which, on the present hypothesis, it seems difficult to give any rational explanation.

5. The most recent hypothesis is that of Cappocci of Naples, who regards the aurora borealis, shooting-stars, aerolites, and comets, as having all the same origin, and as resulting from the aggregation of cosmical atoms, brought into union by magnetic attraction. He supposes that in the planetary spaces there exist bands or zones of nebulous particles, more or less fine, and endued with magnetic forces, which the earth traverses in its annual revolution; that the smallest and most impalpable of these particles are occasionally precipitated on the magnetic poles of our globe, and form polar auroras; that the particles a degree larger, in which the force of gravitation begins to be manifested, are attracted by the earth, and appear as shooting-stars; that the particles in a more advanced state of concretion give rise, in like manner, to the phenomena of fire-balls, aerolites, &c.; that the comets, which are known to have very small masses, are nothing else than the largest of the aerolites, or rather *uranolites*, which in course of time collect a sufficient quantity of matter to be visible from the earth. The theory of Cappocci differs from Chladni's only by the introduction of magnetic forces among the particles, and it is obvious that all the objections to the former theory apply with equal force to this. It may be remarked, however, that some physical connexion between the phenomena of shooting-stars and aurora had been already suspected, and the observations adduced by M. Quetelet afford reason to suppose that the latter phenomenon is also periodical.

From the difficulties attending every hypothesis which has hitherto been proposed, it may be inferred how very little real knowledge has yet been obtained respecting the nature of the shooting-stars. It is certain that they appear at great altitudes above the earth, and that they move with prodigious velocity; but every thing else respecting them is involved in profound mystery. From the whole of the facts M. Wartmann thinks that the most rational conclusion we can adopt is, that the meteors probably owe their origin to the disengagement of electricity, or of some analogous matter, which takes place in the celestial regions on every occasion in which the conditions necessary for the production of the phenomena are renewed.

The concluding part of Mr. Galloway's paper contains an account of the different attempts which have been made to deduce differences of longitude from the observation of shooting-stars. That meteors which appear and are extinguished so suddenly, and which by reason of their great altitude and brilliancy are visible over considerable portions of the earth's surface, would afford excellent natural signals, provided they could be identified with certainty, was an obvious thought; but so long as they were regarded merely as casual phenomena, it could scarcely be hoped that they would be of much use, in this respect, to practical astronomy. As soon, however, as their periodicity became probable, the observation of the phenomena acquired a new interest. In observing the meteors for this purpose, it is assumed that they appear instantaneously to observers stationed at a distance from each other, and that the meteors seen by different observers so placed are identically the same. These points are not altogether free from uncertainty; but the results of the trials that have been already made may be regarded as favorable, and as showing that among the other methods of determining astronomical positions the observation of shooting-stars is not to be disregarded.

ENGLISH EXPIRED PATENTS.

William Stratton, of Limehouse, engineer, *an improved apparatus for heating air by means of steam*, Feb. 12.

John George Christ, of Bishopsgate-street, London, gent., for *improvements in copper and other plate printing* (communicated by a foreigner) Feb. 14.

BRITISH PATENTS.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 100.)

Thomas John Davis, Esq., of No. 5, Bloomsbury-place, Bloomsbury-square, Middlesex, for *certain improvements in the form and combination of blocks of such materials as are now used, or hereafter may be used, in building, or for paving public or private roads and courtyards, or private and public causeways or sub-ways, or any other purposes to which the*

form or combination of blocks may be applied, Feb. 8.—Claim first.—The mode or shape of a series of compound blocks or prisms, which the patentee calls stereo-prisms.

Claim second.—The mode of combination of the same, and the mode of employing in combination, for building, paving, or any other purposes, any blocks, materials, or substances, of such mode or form or shape.

Claim third.—The application and introduction of iron or wooden rods, for the purpose of keeping the compound prisms, or a combination thereof, in a vertical position, and thereby strengthening the same.

Claim fourth.—The application and introduction of stone, or other materials, into the spaces of the peculiar mode of combination of compound prisms, when such spaces occur therein, whereby the sliding or slipping of animals on the surface of any such combination will be very much or altogether prevented.

This invention consists of improved forms of blocks of wood, stone, iron, or such other materials as are now used in building or paving, and an improved method of combination thereof.

The blocks consist of a natural series of rectangular prisms, consisting of one simple or single prism, and the rest united or compound; that is to say, of a single rectangular prism, a double rectangular prism, a treble rectangular prism, and so on; their strength, when combined, increasing as the number of prisms in each particular compound increases. The single rectangular solid prism, to be contained under six equal or unequal rectangular parallelograms. The double rectangular solid (or if of iron, hollow) prism, to be of the form of a superior and inferior rectangular prism, and when of wood each prism thereof to be of unequal length, breadth, and depth; but if of other materials, the prisms of the double prism may be of any dimensions, connected together by natural or artificial means, the upper one being placed on and across the middle of the upper surface of the lower one, so as to be at right angles to each other. When the rectangular prisms of the said compound shape are intended to be connected naturally, they may be so obtained from a solid rectangular prism, or other mass of matter containing their dimensions, and formed by taking four rectangular sections therefrom. A similar form or shape may be obtained artificially by using two single rectangular (and if of wood, unequal) prisms, to construct this compound form or shape, making one the superior, and the other the inferior, prism, and joining or connecting them together by cement or other artificial means, in the mode and of the compound form of a double rectangular prism, as before described.

The treble rectangular solid prism (or if of iron, hollow) is to be of the compound form of superior, middle, and inferior rectangular prisms, connected together by natural or artificial means; the centre of the middle one being placed on and across the centre of the lower one, at right angles thereto; the upper rectangular prism being placed in like manner on and across the middle one, and at right angles thereto.

These compound forms of prisms are derivable from iron, stone, wood, bricks, or other materials.

DOWNES EDWARDS, of Surbiton-hill, Kingston, Surrey, farmer, for *improvements in preserving potatoes and other vegetable substances*, Feb. 8.—The patentee does not claim any of the apparatus herein described, or confine himself thereto; but he claims the mode of preserving potatoes in a cooked or partially cooked state, by means of obtaining the substance of potatoes, in a separated, or finely divided, and dried state.

The potatoes are first well washed and cleaned from the dirt, and then boiled or steamed, till the skins begin to crack; the skins are then pealed off, and the eyes and specks carefully taken out. After this they are put into a cylinder of iron plate, tinned on the inner surface, and closely pierced with small holes about one eighth of an inch in diameter, and by means of a powerful screw a piston is pressed down into the cylinder, and the potatoes are forced out through the small holes. The substance of the potatoe thus prepared is spread evenly and thinly upon hollow tables of tinned iron, heated to from 100 deg. to 160 deg., the lesser degree of heat being applied as the potatoe approaches dryness. The variation of the temperature is obtained by regulating the supply cocks of the supply or main pipe from the boiler, the steam in which is kept at a pressure of ten pounds to the inch. The potatoes are well raked during the time they are on the hollow tables, and after they are thoroughly dried are packed up in casks or other vessels.

JOHN ISAAC HAWKINS, of College-place, Camden Town, Middlesex, civil engineer, for *an improvement or improvements in buttons, and in the mode of affixing them to cloth* (communicated by a foreigner), Feb. 8.—Claim first.—The formation of the end of the shank of a button, into the figure of a cup, whereby a moderate degree of force applied to the brim of the cup, pressing it first outwards, and then downwards, will be sufficient to firmly rivet the shank upon the disc, or to rivet a shanked disc upon a button.

Claim second.—The formation of a tool, to be operated on either by a press or hammer, for effecting the rivetting of the brim of the cup with little force, and at the same time impressing the rivetted part with an ornamental surface.

Claim third.—The application of a press, having a recess for receiving the folds of a garment, which press is used for the purpose of rivetting the shank of a button when placed at a considerable distance from the edge of the garment.

The shank of the button is formed with a recess or cup in it, and is passed through a hole in the cloth; a disc or plate of metal is then placed on it, the shank protruding through a hole in the centre of the disc. The button is now placed in the press (which is similar to those used for applying metal eyelet holes to stays), with its ornamental surface downwards, in a matrix or mould, in order to prevent its being injured by the force exerted in rivetting, and the cloth is placed in the recess of the press; a punch of a peculiar form is now placed on the top of the shank, and forced down into its cup by the screw of the press, by which means the upper edges of the cup are forced outwards and downwards upon the disc, and the button is secured. The button may also be rivetted by striking the punch with a hammer, instead of using the press; and buttons with four holes for trowsers, which have always been sewed on, are secured by a double shank, which enters through a hole in the centre of the buttom, and is rivetted at both ends.

Claim fourth.—The formation of a matrix or mould to fit the pattern of the button, and prevent undue pressure on the prominent parts of the ornamental surface.

In order to produce the matrix, the patentee constructs a hollow mould, of the form and size of the body and stem of the intended matrix. This mould, properly lubricated, is filled with plaster of Paris mixed with water, and before the plaster sets, a button is placed with its face or ornamental side down upon, and slightly depressed into, the surface of the water of the plaster. From this, as a pattern, the patentee casts in a flask in the ordinary way of sand casting, a matrix of type metal, to be used as a working matrix, but in place of sand he uses rotten stone, finely powdered, and moistened with water, which will give the matrix a smoother surface.

FRANCIS WILLIAM GERISH, of East-road, City-road, Middlesex, ironmonger, for *improvements in apparatus to be used as a fire-escape, also applicable to other purposes where ladders are used*, Feb. 8.—Claim.—The mode herein described of constructing iron ladders, for fire-escapes and other purposes for which such ladders may be required.

The ladder is composed of three lengths, the upper parts sliding into the lower one, and the uprights are formed of iron tubes. The rounds or steps of the upper parts of the ladder are capable of sliding up and down, and are retained in their proper positions when the ladder is extended by links, each pair of which is coupled together by pin-joints, the other end of each link being connected to the sliding socket of the step, or round, by a pin-joint. The rounds of the lower part of the ladder are fixed in their places to the sides or uprights. The top part of the ladder is provided with a pair of rollers, to facilitate its being raised against the side of a house.

To the bottom of the top part, which slides into the middle part, is attached a rope, which proceeds up the interior of the middle part, and down the outside of it, to the top of the lower part, where it is fastened; to the bottom of the middle part another rope is attached, which, after proceeding up the interior, and down the outside of the lower part, is passed round a windlass at the bottom.

On winding up the rope by turning the windlass the middle part of the ladder will be raised, and the top of this part, as it rises, pushing against the rope which is attached to the bottom of the top part, will cause it to rise also.

BARON CHARLES WETTERSTEDT, of Limehouse, Middlesex, for *improvements in preserving vegetable, animal, and other substances from ignition and decay*, Feb. 11.—The first part of these improvements is a composition to prevent ignition.

The patentee dissolves soda of commerce in water, so as to produce a saturated solution; the clear liquor is then drawn off by a syphon, and evaporated slowly in a close shallow vessel, until a drop of the liquor being dropped on a glass plate it will crystallise quickly. The liquor is then allowed to cool and crystallise, and the mother-waters are drawn off, evaporated, and crystallised; the crystals thus obtained being used for more common purpose than the crystals from the clear liquor. The first crystals, viz., those from the clear liquor, are now dried on canvass stretched on frames, and then, to five or six parts by weight of these crystals, is added one part of gum or gelatine, and they are ground together in a mortar. This composition is placed on canvass stretched on frames in a close room, and submitted to the action of carbonic acid gas for twelve hours; the composition is then taken out, and stirred, and again submitted to the gas for another twelve hours.

In using the above for making muslin, calico, &c., fire-proof, one pound of the composition is dissolved in a quart of warm water, and is used in the same manner as starch, and the article is afterwards mangled or ironed, but if it is ironed the iron must not be so hot as usual.

A coarser kind of composition for making woodwork fire-proof is made of soda and ground glue, by the same process.

The second part of these improvements is a mode of preserving buildings from fire.

The walls and ceilings of the rooms, as well as the roof of the building, are covered with plates of metal, a space being left between it and the wall or roof, which is filled with a non-conducting substance, and along the ridge of the roof is fastened a large pipe, having smaller pipes extending to different parts of the roof; so that water, being introduced into these pipes by a force pump, the roof, in case of fire, can be deluged with water.

Large pipes perforated with small holes are placed round the rooms, occupying the place of the cornice, and they communicate with a cistern or force pump, by means of which a plentiful supply of water can be introduced into any room on fire.

The patentee likewise shows another mode of preserving rooms from fire. A large pipe open at both ends (which turns up towards the ceiling) is suspended from its centre by a hollow axis, so as to be parallel and nearly close to the ceiling of the room; and water being introduced into it through its hollow axis, will cause it to turn round, and scatter the water over the ceiling and sides of the room.

The third part of these improvements is a peculiarly-shaped vessel, which is filled with water, and kept suspended near the fire-place; so that on

a person's clothes catching fire they may empty it over them.

JOHN PETER ISAIE PONCY, of Well-street, Middlesex, ~~watch-maker,~~ for *improvements in clocks and chronometers* (communicated by a foreigner), Feb. 13.—The patentee claims the mode of constructing chronometers and clocks for a longer period without being wound up, and in such manner, that two main springs are used, in combination with what he calls a constant power or regulator, whereby the power of the two main-springs is transmitted to the escapement by means of such constant power or regulator.

The power of the two main springs is communicated to the escapement by means of the constant power or regulator, which is formed of one wheel of eighty teeth, inside of which is fixed a barrel with serrated edges, having a spring and catch, and kept by two holding pieces. The wheel which contains the barrel is moved by the action of the spring of the barrel while unwinding, and takes into the pinion of a wheel that turns the pinion of the escapement. In applying this constant power to a clock, the wheel which contains the barrel takes into the pinion of the escapement. The patentee observes, that by varying the naves of the wheels, he can vary the length of time that the chronometer or clock will go.

One of the advantages of this mode of constructing chronometers is, that should either main-spring break the other will have sufficient power to keep the chronometer going, as the barrel containing the broken spring could not interfere with the proper working; but as only half the power would be exerted, it will be necessary to wind up the going barrel twice in the same time, instead of once, if both barrels were going. Another advantage is, that the spring, not being connected with the escapement, any common spring may be used.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page* 101.)

MILES BERRY, of 66, Chancery-lane, Middlesex, patent agent, for *certain improvements in the arrangement, construction, and mode of applying certain apparatus for propelling ships and other vessels* (communicated by a foreigner), Feb. 14.—Claim.—The herein described manner of locating the two propellers in the bows of the boat or vessel, and causing them to act upon the water in a direction inclined from each other, in the manner, and for the purpose herein set forth.

This invention consists in constructing the bow of the boat or other vessel, so as to accommodate the screw, or other propellers, which are placed there, and which are intended by their particular position, and mode of action, to draw the water directly from the bow, and to give it, as it passes towards the stern, such a direction as shall greatly diminish the resistance offered to the passage of the boat.

The screw propellers have each four spiral wings or threads, one wheel being a right, and the other a left-handed screw, the threads winding at an angle of about forty-five degrees. They are made to taper each way, from the centre towards the ends, where the wings or threads are rounded. Their shafts incline towards each other as they approach the bow, so as to be about six feet apart at their fore, and nine feet at their rear ends. They have their fore bearings attached to the guard or bow of the boat; their aft ends may pass through stuffing-boxes, or be in any other suitable manner connected to the driving machinery. Instead of using continuous wings or threads to the screw-wheels, such wings may be divided into segments of five, six, or more inches in width.

Two wheels, resembling the ordinary paddle-wheels, may be substituted for screw propellers; in which case the axis of the said paddle-wheels are to be placed horizontally, but so that they will form an obtuse angle with each other, and that the action of the paddles shall be in the line of the direction of the shafts of the screw propellers, or nearly so, as above described.

The object of placing the propelling wheels, and of so constructing and arranging them as that they shall not act in the direction of a parallel to the keel, but outwards towards the bilge as above described, is, that they may withdraw the water from the bow of the vessel, and give to it a direction which will lessen its retarding action, and carry it most directly to the stern; by which means it has been experimentally proved, that the water will be left much more smooth and undisturbed than by any other mode of propelling hitherto essayed.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 24th of April.

Charles Payne, of South Lambeth, Surrey, gent., due April 13.

Robert Pettit, of Woodhouse-place, Stepney-green, gent., due April 15.

Henry George Francis Earl of Ducie, of Woodchester-park, Gloucester, and Richard Clyburn, of Uley, engineer, and Edward Budding, of Durseley, engineer, due April 15.

William Newton, of Chancery-lane, civil engineer, due April 15.

James Hancock, of Sidney-square, Mile-end, civil engineer, due April 15.

Henry Pinkus, of Panton-square, Middlesex, Esq., due April 15.

PATENT LAW CASE.

AMENDMENT IN THE TITLE OF A PATENT.—In the Rolls Court on Monday, a petition of Mr. Christopher Nickells was considered, to amend the proceedings for obtaining a patent. In the Queen's Privy Seal Bill and the enrollment thereof, the invention was designated as an "Improvement in machinery for re-covering fibres applicable in the manufacture of braids and other fabrics." The object of the petitioner was to strike out the letters "re," the invention being an improvement in machinery for "covering" fibres, &c., not for re-covering. The prayer of the petition was opposed by the London Caoutchouc Company, at whose instance it appeared that a *scire facias* had been issued, and 61 objections had been taken to the petitioner's patent. The case was argued by Mr. Pemberton, Mr. Kindersley, and Mr. Hindmarsh for the company, and Mr. Tinney, Mr. Dixon, and Mr. Corey were for the petitioner; but before the arguments were over the Court rose.

FOREIGN INTELLIGENCE.

FRANCE.

ACADEMY OF SCIENCES.

At the sitting of the Academy on the 8th inst., some interesting researches relative to the growth of the bones of animals, were announced. The reporter of the Academy's proceedings in the *Journal des Debats* thus notices the substance of the discoveries announced on this subject:—

"We have already alluded to the experiments of M. Flourens, on the coloring of the bones of young animals that have been fed on madder, for the purpose of ascertaining in what manner the parts of the skeleton grow, by observing the progress of the coloring as the madder penetrates them. It was indeed a fortunate suggestion which induced M. Flourens to resume the beautiful experiments of Duhamel, which remained incomplete, and to continue them with such perseverance. The manner in which the growth of bones takes place, will be rendered perfectly evident by means of these new investigations, so carefully carried on. Thus, after having established the law which governs their growth in diameter, M. Flourens is now examining the manner in which they increase in length; and it is by means of the beautiful red tinge communicated to the bones by the madder, and which penetrates their various layers, that he determines the progress of ossification.

"By administering madder to young animals for a certain time, and by then discontinuing it, and again repeating this process, alternate layers of red and white are produced in the bones, which permit the progress of their growth to be traced, and enable us to ascertain whether it takes place from the interior to the exterior, or the reverse, and in what manner the elongation of the bones is effected. It is by this means that M. Flourens has discovered, what had not previously been attended to, that the bones grow towards the extremities, by layers placed upon one another.

"Duhamel had previously endeavored to decide this question by an ingenious experiment, which consisted in piercing holes at equal distances in the bone of the foot of a young chicken. In the course of time this bone being elongated by the growth of the animal, Duhamel ascertained that the size of the space between the holes had not changed, while the distance from the last hole to the extremity of the bone was considerably increased; hence it resulted that the growth of the bone took place at the two ends, and not in the centre. The recent experiments of M. Flourens not only establish this as an undoubted fact, but they further prove how this growth takes place, by layers in juxta-position.

"M. Flourens feels convinced, that the substance of bones is continually renewed; so that at the expiration of a certain time, none of the particles are in existence that composed the bones some months before; which confirms that beautiful idea of Buffon, that the most durable part of matter is its form: its composition being never stationary, and changing, as it were, every instant.

"This truth has recently received further corroboration in the law of substitutions, which shows us heterogeneous molecules substituted for each other in chemical compounds, without the exterior form and character of these substances undergoing any change."

At the same meeting of the Academy the following papers and notices were communicated:—

M. Millon read a paper deserving the serious attention of chemists, on the hydrogeneous combinations of chlorine. The author likewise communicated at the last sitting a remarkable action of iodine on chloride of potash.

M. Bayard laid claim to the priority of the discovery of sensitive paper, mentioned in the preceding sitting, in the name of M. Talbot by M. Biot. In fact, a sealed packet deposited more than a year ago by M. Bayard, established his claims in a manner that appeared incontestible.

M. Roussignon has succeeded in extracting a new essential oil from certain decayed apples, and from many other fruits. That particular oil is different in the apple, the pear, the grape, &c.

M. Dumeril made a favorable report of a memoir by M. Valenciennes, on the subject of the organs of electrical fishes.

It is known that many fish of very different species possess the power of suddenly transmitting at will strong electric shocks, either to drive away their enemies, or to answer their own purposes in striking or paralysing in this manner the animals on which they feed. The most curious and most important fact resulting from the investigations of M. Valenciennes, is the discovery of the true structure of the electric organ, which

is composed of a much greater number of voltaic plates laid upon one another, than had been indicated or described by former zoologists.

M. Langlois communicated some new observations on the action of ammoniacal gas on burning coals, on the formation of cyanhydrate of ammonia by the disengagement of hydrogen gas.

THE DUTY ON STEAM-ENGINES IMPORTED INTO FRANCE.

In the sitting of the Chamber of Deputies, on the 9th inst., the Customs Duties on the importation of foreign marine steam-engines, led to a long discussion. The proposition of the Government, and of the committee to which the question had been referred, was to admit those engines free of duty, for the purpose of encouraging the building of French steam-ships; but at the same time to grant a premium of 33 per cent. on all French-made engines, so as to give the French engineers that advantage over the English manufacturers, as an encouragement for them to make large steam-engines, which at present they have not the means of doing. M. Pauwels, a French engine-maker, and a member of the Chamber, opposed the government proposition, and moved an amendment for imposing a duty of 21 per cent. on foreign engines, and a premium of 21 per cent. on French engines in addition. This amendment was, however, rejected, and the government proposition was adopted. The Minister of Commerce, M. Cunin Gridaine, in supporting the original motion, made the following observations on the advantages of more freely admitting English and other foreign steam-engines free of duty:

"The Government is aware that in the inferior state of our navigation, compared with that of England, for example, there are powerful and political reasons for making an alteration in this state of affairs. We should have remained for a length of time without any change being effected, if those obliged to make use of steam-engines in international navigation had remained in their former position.

"In England, the value of a steam-engine of 450-horse power, is worth 600,000 frs. Under the present duties the engines when imported from England into France would be subject to a duty of 33 per cent., that is 198,000 frs.; consequently the English engine when it arrives at Havre would cost 800,000 frs. What means then are our ship-owners to adopt in order to compete with foreigners subject to such a duty? There are none. International navigation must be abandoned. Government is aware of it, and has proposed to reject the proposition of the commission, and to admit English steam-engines free of duty; so that they will not be more expensive at Havre than they are in London, viz., 600,000 frs. The considerations which have influenced the decisions of Government are of two kinds; but we must mention in the first place, the principal question, which influences all the others. It is navigation; it is the power of navigation by steam; and it is in order to establish this power that the treasury consents to the sacrifice that we have just proposed to you to make. It is pretended, that French engineers are not sufficiently protected with a premium of 30 per cent.; 21 per cent. is demanded on the importation of foreign engines, and then a protection, or drawback, or premium of 21 per cent. on exportation. In other terms, it is a demand for protection to the extent of 42 per cent. In this consists the principle of the amendment made by M. Pauwels, and I believe that I have the same opinion of it as is universally entertained.

"The plan, or rather the three plans, proposed by the honorable M. Pauwels, are inadmissible. To replace the *ad valorem* duty by a duty on weight, presents very great difficulties. This question has been carefully considered by Government, and a return to the duty on weight has been rejected.

"I have said that the proposition of M. Pauwels naturally induces us to impose a drawback on all the steam-engines manufactured in France; I have shown that this would not be just. I have endeavored to show, and I think that I have proved, that if Government is decided to make a sacrifice in such a position, it is in favor of international navigation, and to give it as much encouragement as possible. By adopting this measure, it has endeavored to conciliate the interests of our engineers with the progress of navigation. Whatever considerations may be advanced in favor of French engineers, there are limits which must not be exceeded. The effect of M. Pauwell's proposition would be, that the expense of engines, instead of being 600,000 frs., would amount to 800,000 frs.; and we should place the ship-owners in the exact position from which we wish to rescue them.

"I think that I have clearly stated the consequences of the amendment. It would be a greater loss to the treasury; the sacrifice would be prejudicial to international navigation, that we are desirous to encourage; it would be of advantage only to private individuals; and I hope the Chamber will not sacrifice to that a principle to which it has always been opposed."

The French Academy, at its meeting of the 28th instant, made an unsuccessful attempt to fill up the chair of the late M. de Bonald, by three successive scrutinies to determine the election between MM. Ballanche, Ancelot, and Kératry. The absolute majority required was 17, the voters being 32; and the real contest lay between Messrs. Ballanche and Ancelot,—the former of whom twice obtained 15 votes, and the latter had on one occasion 16. The election has been postponed for a month.—The Academy of Moral and Political Sciences has named as corresponding members in its section of Political Economy, MM. Porter and Alban de Villeneuve, and in its Historical section, the historian of the Popes, Leopold Ranke.

A general account of the losses caused by the late inundations in the south of France, duly certified by the *procès-verbaux* of all the local authorities, has just been published. It appears that 58 communes were inundated extensively; that the damage done to land, houses, and other buildings, is 9,195,326f.; to merchandise, crops, furniture, animals, &c., 6,396,108f.; making a total loss of 15,891,434f. The number of persons who have been sufferers is 7,972.

The Copyright Bill excites considerable interest in the Paris literary circles. An able and eloquent letter of M. de Lamartine appeared in Sunday's *Presse*, enforcing arguments for the protection of authors. It will be some days before the committee of Deputies makes its report, as it is examining the most celebrated authors and publishers.

BELGIUM.

The *Moniteur Belge* contains a royal decree, founded on two preceding ones, of the 1st of October, 1838, and of the 18th of the following October, which announce that there is to be formed for the benefit of pupils, 1st. a collection of models in relief, of hydraulic works, or of the most remarkable native and foreign productions; 2d. a series of designs, on a large scale, of all public buildings. Consequently, every director of public works will be bound for the future to execute, or to cause to be executed at his expense, under the direction of the engineer entrusted with the works, and on a reduced scale of from 1 to 5 centimetres per metre, a model of the works of art, in relief, or in drawing, contained in his district, which will be assigned to him for this purpose by the Minister of Public Works.

The public sale of the establishments of M. John Cockerill, at Seraing and at Liege, for the liquidation of the estate, is announced for the 10th of March. These establishments comprehend coal mines, and grants of mines of coal and iron, manufactory of iron, workshop for builders, manufactory of boilers, a workshop for mechanics, copper foundry, manufactories for toothed wheels, timber yards, iron foundries, manufactory of cards, and dwelling-houses at Liege and at Seraing.

In imitation of the Society for the Protection of Animals, in England, a society is formed at Brussels, composed of foreigners and natives, the object of which is to protect domestic animals from cruelty.

THE BELGIAN RAILROADS.

Number of passengers, and amount of receipts, from the 5th of May, 1835, to the 31st of December, 1840:—

YEARS.	NUMBER OF PASSENGERS.	RECEIPTS.
1835.. (8 months) ..	421,439..	268,997,50 frs.
1836 (the whole year)	871,307..	825,132,85
1837..............	1,384,577..	1,416,932,94
1838..............	2,238,303..	3,097,833,40
1839..............	1,952,731..	4,249,825,04
1840..............	2,198,419..	5,335,167,05
Totals	9,066,776	15,193,938,78 frs.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

LONDON AND BIRMINGHAM RAILWAY.—The half-yearly meeting of proprietors was held at Birmingham on Friday, when the following satisfactory report from the directors was read:—

"The directors have to report that the traffic for the six months which ended on the 31st December last has considerably exceeded that of any preceding half-year. The accounts which have been laid before the proprietors at the present meeting show a receipt on the revenue statement, under the usual heads of passengers, &c., parcels, merchandise, and cattle, of £405,040 14s., being £61,846 7s. 9d. more than for the six months to 30th June last, and £61,130 11s. 6d. more than for the same period to 31st December, 1839; a result which is the more satisfactory, that it is not accompanied by any corresponding increase of charge.

"'Maintenance of Way,' which, in addition to the contract price for keeping the road in good working condition, comprises all extra expense for slips, and for repairs of station buildings, is £6,228 18s. 8d. less than for the preceding half-year; a reduction of charge which is due to the generally-improved state of the works, and especially of the principal embankments, which by their increased stability and consolidation, have presented an effectual resistance to the heavy winter floods.

"The per-centage of the locomotive and other charges, as compared with the receipts, is, in every case, less; and the gross charge on the traffic (including the mileage duty to Government and parish rates) will be found in the last half-year to be as £30 5s. 7d. per cent. to the gross receipt, instead of £34 16s. per cent., which it was in the preceding half year.

"Deducting from the net profit of £186,689 11s. 8d. the sum of £20,822 14s. 11d., which was taken from the reserved fund, pursuant to the resolution of the last general meeting, there remains a disposable balance of £165,866 16s. 9d., on which the directors recommend that a dividend be declared of £4 per £100 share; £1 per £25 share; and 19s. 2d. 2-5ths on £24; called before the 31st of December, and paid on each £32 share; leaving a sum of £10,866 16s. 9d. to be carried to the credit of next account.

"In referring to the progressively-increasing traffic of the railway, as evinced by the half-yearly reports, the directors may be allowed to notice the gratifying fact, that out of 1,483,123 passengers, conveyed on an average sixty-five miles and a quarter each, from the 17th of September, 1838, to the 31st of December last, according to the Stamp Office returns, not one accident attended with loss of life or limb to a passenger has occurred, although during the whole of this period the works were undergoing those extensive repairs which are inseparable from great excavations and em-

bankments, and requiring the frequent passage along the line of trains heavily laden with materials. If, then, under these circumstances of disadvantage, the directors are enabled to exhibit results which in the infancy of the undertaking could only have been attained by regulations well considered, and, with few exceptions, carefully observed, it must be admitted that railways afford ample assurance for the safety of travelling, and that the London and Birmingham line possesses resources adequate to any extent of traffic."

The report concludes by alluding to some financial details, and to the recommendation of the directors to create new shares for the redemption of the mortgage debt of £1,375,000.

A resolution was passed, declaring a dividend at the rate of 8 per cent. per annum out of the profits of the undertaking. Another resolution was passed, authorising the conversion of the mortgage debts of the company into new shares of £32 each. A discussion of considerable interest, arising out of the following circumstances, then ensued:—The principal workshops of the company for the repairs of engines, &c., have been erected at Wolverton, a station about midway between the two termini of the railway. So extensive is the establishment at that place, that a considerable village, composed of the men in the company's service and their families, has sprung up where formerly there was not a single habitation. The company has erected houses for the men, and allotted gardens to them, and some time since voted a grant of money for the erection of schools for the infant and adult population, but still there were no means of supplying them with religious instruction. The trustees of the Ratcliffe estate, through which this part of the railway is made, thereupon offered to build and endow a church, and to provide a fund for future repairs, if the railway company would contribute £1,000 towards this desirble object. Accordingly, at the last meeting a proposal that such contribution be made was brought forward, and was carried with but one dissentient voice. In the interim between that meeting and the present some twenty-eight or thirty of the proprietors, almost all of whom are members of the Society of Friends, objected to the grant, and memorialised the directors on the subject. They also took the opinion of the Attorney General upon the legality of any such grant when made by a railway company, which opinion was against the grant. The matter now came on for discussion. The Quakers proposed, therefore, that the resolution of the previous meeting should be rescinded, and that the amount required should be raised by voluntary subscription. To this it was moved as an amendment that their proportion of the £1,000 (about 4½d. per share) should be returned to all who dissented from its appropriation to the purpose proposed, and after a very long discussion, which was conducted on both sides with much good feeling, a vote was taken, when there appeared for the amendment 25, against it 17, thus confirming by a majority of eight, the original grant of £1,000, subject to any deduction which may be made in respect of the dissentients' shares.

The directors of the North Midland Railway have determined to erect two intermediate stations between Chesterfield and South Wingfield, one at North Wingfield and the other at Stretton.

Northern and Eastern Railway.—A general meeting of the proprietors of this railway was held on Thursday, at the London Tavern. William Crawshay, chairman of the board of directors, presided. This line joins the Eastern Counties Railway at Stratford, and is intended to terminate for the present at Bishop Stortford. It was opened as far as Broxbourne in July last, and the report laid before the meeting yesterday, and unanimously approved of, gave a favorable description of the results. The works between Broxbourne and Bishop Stortford are to be pushed on with great vigour, and it was stated that, in consequence of the level character of the greater part of the country through which it runs, the cost of the whole railway will not exceed £22,000 per mile. The cost of other lines terminating in the metropolis has varied from £25,000 to £60,000 per mile. An application is now before Parliament for power to construct a branch-line to Ware and Hertford. It is probable that the line will also be extended to Cambridge, although, perhaps, not by that company. The line, as originally projected, extended to Cambridge; but the company subsequently obtained an Act, empowering them to abandon the portion below Bishop Stortford. The business of the day having been transacted, a vote of thanks to the directors for their gratuitous services was unanimously carried, and the meeting separated.

The Safety of Railway Travelling.—We are informed that the number of passengers conveyed upon the Great Western line, in the six months ending 31st December last, amounted to upwards of 648,000, and that not a single fatal accident has happened to one of them. Of this number about 492,000 were carried on the London division of the line, and 156,000 on the line between Bristol and Bath, the opening of which took place on the 31st August last.

Doncaster and North Midland Railway.—We regret to learn that this projected measure, highly important as it is to the best interests of the town of Doncaster, and its extensive agricultural district, is postponed for the present parliamentary session. Notices, however, for the next session will, we understand, be forthwith given; and in order to render the project more useful in its operation to the neighbourhood, as well as beneficial to the subscribers, an alteration will be made in the line near Conisbro', on the south side or right bank of the river Don.—*Doncaster Gazette.*

The London and Brighton Railroad.—The works on this line of railroad, near Brighton, which have been greatly retarded in consequence of the late frost, are now going on with great activity. There are at present upwards of 600 men employed in the tunnel at Clayton, and this stupendous portion of the work is expected to be completed by next July, and the embankment and deep cuttings from thence to Brighton are in a very forward state.

On Tuesday, the railway from Stockton to Hartlepool was formally opened by the directors and a numerous party of shareholders and friends. Two trains started from the station at Stockton, at twelve o'clock, and proceeded along the Clarence Line to the Billingham Junction, where the line to Hartlepool commences. On various parts of the road the carriages stopped, and the directors inspected the works, particularly the viaduct near Greatham, consisting of 94 arches. About two o'clock the trains arrived at Hartlepool, where they partook of refreshments at Mr. Southern's inn. Soon after three, they set out on their return to Stockton, where they arrived about four o'clock, and afterwards a numerous party dined at the Vane Arms Inn, H. Vansittart, Esq., in the chair, supported by B. Salvin, Esq., G. H. Wilkinson, Esq., G. Rayson, Esq., &c , &c.

A Railway Servant fined for Drunkenness.—At Union Hall police-office, on Monday, an engine-cleaner in the employ of the Southampton Company was fined, under Lord Seymour's Act, 30s. for being drunk.

Manchester and Leeds Railway.—The recent accident in the Summit Tunnel having been now well nigh repaired, it is intended to commence the conveyance of goods throughout the whole line on Monday next, the 22nd inst., and to run the passenger trains on and from the Monday following, the 1st of March.—*Leeds Observer.*

North-Eastern Railway.—The Floods.—At a meeting of the Commissioners of Sewers for the Half-hundred of Becontree, Essex, on Saturday last, a letter from the Commissioners' Surveyor was read, describing the effects of the railway embankments during the late floods, from which it appeared, that in consequence of several complaints forwarded to Sir John Pelly, chairman for that division of the county, of the obstruction to the usual flowing of the waters in the Walthamstow and Layton Levels, by the embankments of the North-eastern Railway, an investigation took place, by which it was ascertained that the railway embankments so headed the waters as to cause them to be 18 inches deeper on one side the line than another; and the consequence was a considerable degree of damage to the property so deeply inundated. The letter further went on to state that a verbal application had been made to Mr. Stephenson, the company's principal engineer, on the subject, and concluded by requesting Mr. Sterry would adopt such measures as the urgency of the case required, as the railway company could at present remedy the evil at a much less expense than they could at a future period. The Chairman observed that by a clause inserted in the company's own Act, the Commissioners of Sewers had the power, on information of the fact being laid before them, to inflict a penalty of one hundred pounds an hour, for every inch of water found higher on one side of the railroad than on the other. Mr. Sterry (the clerk) said he had not the Act of Parliament with him, but, as far as he could recollect, the penalty was £5 an inch per hour. After a lengthened discussion it was decided that Mr. Sterry, as clerk to the Commissioners, should at once write to the Secretary of the company, apprising him of what had been brought under the notice of the Court, and requesting that he, or some authorised officer of the company, would attend before the Commissioners at their next meeting, when they would go into the whole particulars as to the obstruction, &c.

RAILWAY ACCIDENTS.

Collision on the Croydon Railway.—On Thursday se'nnight, as the last train to London, heavily laden with passengers, was returning from the county election, held at Croydon, when near the Dartmouth Arms station, Sydenham, it came in violent collision with a number of wagons which had been left by an engine that was proceeding to the London station. The concussion was so great that it knocked the wagons to pieces, and most seriously shattered the engine and tender. The engineer and stoker most fortunately escaped without material injury.

Collision on the Grand Junction Railway.—A collision between two goods' trains took place on this railway, near the Whitmore station, on the morning of Thursday week, by which one man, a pig-driver, and a great number of pigs, were killed. It appears that the up-luggage from Manchester and Liverpool is sometimes conveyed in one train, but oftener by two. The trains arrive in Warrington about the same time, and there the business of sorting the wagons, so far as for each to be left at the proper station on the line, takes place. One train is despatched as soon as it can be got ready, and, in pursuance of the regulations of the company, the other is detained an hour or more, so as to remove as far as possible the danger attending a collision. On Wednesday evening the weather changed from a frost to a heavy sleet, which covered the rails with ice of full an eighth of an inch in thickness. This rendered them exceedingly slippery, and much retarded the rate of travelling on the line. The Manchester train, which consisted of upwards of twenty wagons, propelled by the Wildfire engine, left Warrington at twenty minutes past eleven o'clock at night, and the Liverpool train, consisting of nearly fifty wagons, propelled by two engines, at half-past one o'clock on Thursday morning. The Manchester train, owing to the state of the line, was much retarded in its progress, and did not reach Whitmore station until twenty-seven minutes past four o'clock. The Liverpool train made much better speed, the obstruction caused by the ice on the rails being in some degree counteracted by the placing of two carriages loaded with pigs and one luggage wagon loaded, before the engines, and to this may be attributed the fatal consequences that followed; it being generally believed that the luggage in front of the engines prevented the engineers from seeing the line before them, as they ought to have done. The Manchester train had two signal lamps attached to the last

wagon, and while standing at the station an alarm was given, that the Liverpool train was advancing at a rapid rate on the same line. Whether the engineer of the Liverpool train saw the Manchester train or not is a matter of doubt, but certain it is their speed was not sufficiently slackened, and, aided by the descent of the line at this particular spot, they came with frightful force against the wagons of the Manchester train. Both engines were slightly damaged, the two pig wagons were smashed to atoms, and the pigs were strewed about the line in every direction. One of the pig-drivers, James Nester, from Tulsk, county Roscommon, was found amongst the pigs with his face covered with blood, one thigh broken, and otherwise injured; the poor fellow never spoke, and shortly breathed his last. The other driver was also injured, but not so much as to prevent his being removed to the infirmary at Stafford. Twenty-five of the pigs were killed by the concussion. The luggage wagons were only slightly injured, and, strange to say, the engineers kept their places on the engines, and were not in the least hurt. At a coroner's inquest held the following day on the body of Nester, the jury returned a verdict of "Accidental Death," with a deodand on the wagon of *one shilling*.

Accident from Defect in the Rails.—The following passage occurs in a letter received the other day from the Hon. J. E. Elliott, M.P.:—"You were very near having an election in this county the other day. Coming down from town, about two miles on the other side of Wigan, the carriage in which I was, on the railway, owing to some fault in the rail itself, got off the rails, going at the time at the rate of about 30 miles an hour. The wheels, axles, springs, steps, &c., in fact every thing below the body of the carriage, was smashed to pieces; and when at length the engine was stopped, we were left lying in the wreck about two feet from the edge of the embankment, over which we were passing at the time; yet, most fortunately, nobody was hurt.—*Kelso Chronicle.*

Singular Accident on the Great Western.—On Friday last, as the half-past 11 o'clock train from Wootton Bassett-road was proceeding at the rate of 30 miles an hour, near to Wormwood Scrubs, the tire or metal rim which forms the disc of one of the wheels of the engine suddenly broke, leaving the bare spokes in contact with the rail, and consequently very nearly upsetting the engine. The stoker immediately perceiving the danger which threatened the passengers, instantly let off the steam, but he was unable to stop the train before it had proceeded a considerable distance. The assistance of a number of men who were at work on the railway was immediately procured, but from the nature of the accident, they were for a long time unable to be of any service. During the delay, the 1 o'clock train from Wotton Bassett-road, and the 3 o'clock from Slough, arrived, and were detained upwards of two hours. With the assistance of the guards and conductors of these trains, the wheel was repaired in a temporary manner, but not securely enough to permit the working of the engine. A number of the men who were present had therefore to drag the entire train on to Paddington, and the two others were obliged to follow at the same slow pace.

FOREIGN RAILWAYS.

Paris and Rouen Railway.—We hear that Mr. Brassey, the great railway contractor, has taken the contract for the whole of the line at £1,000,000 sterling, and that he has given the planting and lining of the hedges and slopes to our townsman Mr. Rogers.—*Hampshire Independent.*

Public Works in New York.—The sessions of the Legislature of the state of New York was opened on Tuesday, the 5th [illegible], by a message from the Governor. It appeared from this document, that the present debt of the state is [illegible] dols., exclusive of the loans of state stock to the [illegible] railroads and canal companies, many of which would, however, it was believed, be paid by the borrowers. The enlargement of the Erie Canal would alone increase the debt above 30,000,000 dols.

COPYRIGHTS OF DESIGNS.

The following is a List of the Designs Registered under the Act of Parliament, for granting Protection to Designs, from the 12th of November to the 8th instant.

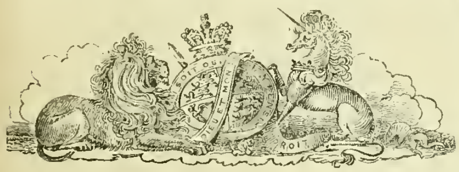
No. of Design.	Date of Deposit.	Name of Proprietor.	Subject of Design.	Duration of Copyright.
	1840			
458	12th Nov.	John Cartwright	Thrashing Machine Drum	3 years.
459	13	Carron Company	Stove	3 "
460 to 476	13	Wilcoxon and Sons	Stained Paper	1 "
477	16	John Rostron	Cantoon	1 "
478	17	Joseph Hiles	Carpet	1 "
479 to 480	17	Broadhead and Atkin	Coffee Pot	3 "
	17	Ditto	Jug Cover	3 "
481	17	William Blews	Candlestick	3 "
482	17	Imray and Fitch	Daily Indicator and Almanack	1 "
483	18	Michell and Son	Envelope	1 "
484	23	Butter, Brothers	Coffin Plate	3 "
485	1st Dec.	Cornelius Warne	Bootmakers' Machine	1 "
486	3	Thomas Horne	Mincing Machine	3 "
487	3	George Hyde	Envelope	1 "
488	4	Thomas Hopkins	Carpet	1 "
489	4	J. C. Bowles	Wafer	1 "
490	7	Buckley, Brothers	Gambroon	1 "
491	7	Charles Stocken	Bottle Stopper	3 "
492	7	Ditto	Envelope	1 "
493	8	Henry Dekar Smith	Japanned Baize	1 "
494 to 497	14	G. and H. Talbot and Sons	Carpet	1 "
498	14	Thomas Walker	Stove	3 "
499	14	Ibotson and John Walker	Cantoon	1 "
500	16	W. H. Phillips	Machine for Improving Draughts in Chimneis, &c.	3 "
501	17	J. G. Harris Ronketti	Barometer	3 "
502	18	Taylor, Brothers	Wafer Press	3 "
503	21	David Smith	Hot Gas Burner	3 "
504	21	Lt. Col. Baron de Berenger	Envelope	1 "
505	22	George Clarke and Co.	Cantoon	1 "
506	22	David Davies	Railway Carriage Break	3 "
507	28	Ibotson and Jno. Walker	Cantoon	1 "
508	28	Shaw and Fisher	Coffee Pot	3 "
509	29	Henry Greville	Heat Reflector	3 "
	1841			
510	4th Jan.	Southwell and Co.	Carpet	1 "
511 to 516	5	Williams, Cooper, Boyle, and Co.	Stained Paper	1 "
517	5	Wm. Grounsell	Dressing Machine	3 "
518	11	Henderson and Co.	Carpet	1 "
519	11	Charles Henry Ackerly	Asthmatic Breast Lamp	3 "
520	11	Samuel Holday	Box for Snuffers	3 "
521 to 528	11	George Clarke and Co.	Cantoon	1 "
529	13	George Hyde	Envelopes	1 "
530	14	Robert Frais Grastsby*	Plough Share	3 "
531	15	Thomas De la Rue and Co.	Embossed Metal	3 "
532	18	Wm. Richardson and Sons	Cantoon	1 "
533	18	Pershouse and Welch	Candlestick	3 "
534 to 546	19	Wm. Evans	Stained Paper	1 "
547	19	Richard Gibson	Envelope	1 "
548	20	Thomas Cole	Carpet	1 "
549	20	James Yates	Fender	3 "
550	21	B. W. Hickling	Brass Roller	3 "
551	22	John Aston	Button	3 "
552	25	Pardoe, Hoomans, and Co.	Carpet	1 "
553	25	Charles Smith	Color Vessel	1 "
554 to 558	26	James Boswell	Stained Paper	1 "
559	26	James Shillito	Ribbon	1 "
560	27	George Clarke and Co.	Cantoon	1 "
561	27	Ditto	Ditto	1 "
562	29	Barber and Cole	Carpet	1 "
563	29	Ditto	Ditto	1 "
564	29	T. R. Mellish and Co.	Postage Damper	3 "
565	29	Jno. Gough and Sons	Carpet	1 "
566		Ditto	Ditto	1 "
567	1st Feb	Robert Rettie	Anti-Drabble	3 "
568	1	Elliot Bower Taylor	Envelope	1 "
569	1	Wm. Ellis	Enema	1 "
570	2	H. J. and J. Dixon	Carpet	1 "
571	2	Ditto	Ditto	1 "
572 to 575	2	Buckley, Brothers	Cantoon	1 "
576	3	John Chatwin	Button	3 "
577	3	Benjamin Cribb	Label	1 "
578	3	G. Harris and J. D. Cumming	Carpet	1 "
579	5	Robert Sutcliffe Stenton	Knife	3 "
580	5	Wright and Crump	Carpet	1 "
581	8	Jno. Gough and Sons	Ditto	1 "
582	8	Ditto	Ditto	1 "

TO CORRESPONDENTS.

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 21 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes containing the Nos. of every 6 months.



THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, FEBRUARY 20, 1841.

A question of great practical importance was brought before the House of Commons, on Tuesday, by Mr. Mark Philips, relative to the restrictions on the exportation of machinery. All restrictive laws are more or less impolitic, but there are few which are so manifestly absurd in their effects as the restrictions on the exportation of machinery. We are by this means actually depriving the country of a market for the sale of some of our most important branches of manufacture. The notion on which the prohibition is founded is of the crudest kind. It depends on the possibility of keeping foreigners in ignorance of our manufacturing processes, and of depriving them of the possession of the implements of manufacture. All attempts of this kind are not only illiberal, but they generally defeat their own objects. Their effects can only last for a short time, and they end in teaching the foreign manufacturer to make the machinery which our engineers might have been profitably employed in supplying. The impolicy of these prohibitory laws is even surpassed by their absurdity, when they are so imperfectly carried into effect as the existing restrictions against the importation of machinery. To be of any practical effect such restrictions ought to be general; but by the inconsistency of our present customs' regulations, tools, and combinations of machinery for making other machines which may be denominated tools, are allowed to be exported; the parts of machines are also free to go, but the machine itself is not permitted to pass. The law, therefore, is completely inoperative, because English workmen may go abroad to put the machines together, and the only effect of the restrictions is to increase the cost to the foreign purchaser. This might, indeed, partially answer the purpose for which the law is intended, as it would be the means of increasing the cost of the manufactured fabrics, provided the foreign manufacturers were always compelled to have resource to the roundabout method of obtaining English machinery. But the engineers on the Continent having our perfect machines to copy from, are enabled to compete with the English machinists, and to supply the manufacturers at a cheaper rate than the prohibited article can be sent abroad, taxed with all the additional expenses consequent on evading the law and running the risk of forfeiture. It was well observed, during the discussion, that if the prohibitive system were to be carried out to an available extent in depriving foreigners of the advantages of English machinery and English inventions, that all artizans ought to be laid under embargo, and no patents permitted to be taken out abroad. No one would now wish to see the protection to our manufactures carried to that extent, and yet such a proposition would be perfectly consistent with the intention of the law, which is to prevent foreign manufacturers from availing themselves of the improvements in our machinery.

The legislative enactments against the exportation of machinery afford a striking proof of the injustice of the law to inventors. Inventive genius receives no encouragement from the Government; every difficulty is thrown in the way to check improvement and prevent the inventor from reaping the fruits of his talent and industry; and when these obstacles are surmounted, and instruments are perfected which place our manufactures in advance of our continental rivals, the law again interferes to confine, if possible, the use of the machinery within the limits of the British Isles. These prohibitory, though inoperative, enactments, thus admit the national importance of improvements in machinery, at the same time that property in inventions is not recognised by the law, unless protection be specially purchased from the Crown, and obstacles of all kinds obstruct the development of mechanical skill.

The committee of the House of Commons on the Banks of Issue has been re-appointed. The investigation of last session was necessarily limited and partly one-sided, as the committee had not time to pursue their investigations on this important subject so fully as to comprise all its bearings. There are few matters of greater interest to commercial men than the regulation of the currency; and we hope the committee will now be able to satisfy themselves of the necessity of establishing one bank of issue, founded on national credit, by which means most of the causes of the existing fluctuations in the circulation may be removed. It is evident, that so long as there are various banks of issue, each desirous of putting its notes into circulation, it is impossible for the Bank of England to maintain any proper regulation of the currency so as to suit it to the varying wants of the country; even were the Bank Directors to act from no other than the most disinterested and national motives. But they are not in a condition to act freely, for they must have regard to their own liabilities; and in the present state of the law of cash payments, the Directors are compelled to limit their circulation and to increase their stock of bullion at times when, if free to act, without risking their own safety, an extension of the currency would be evidently the soundest policy, and the most advantageous to the commercial interests of the country. The establishment of one national bank of issue appears to us the only effectual means of placing the currency of the kingdom on a solid and unfluctuating basis.

NEW INVENTIONS.

NEW APPLICATIONS OF ELECTRICITY.

We extract from the *John O'Groat's Journal* the following account of two new applications of electrical power; the one to the regulation of time, the other to telegraphic printing. The invention of the clock has been patented, and is already at work: of the printing we have seen specimens; and we understand Mr. Bain intends opening an exhibition in London, for the purpose of making it more generally known.

We have seen some late communications from London, by which we are gratified to perceive that one of our countrymen, Mr. Alexander Bain, from the parish of Watten, an ingenious mechanic, now employed in the metropolis, and who served his apprenticeship in this place to the watch and clock-making business with Mr. Sellar, is likely to succeed in two very extraordinary inventions. The first is in the art of clock-making. It would appear that Mr. Bain has established a method of making clocks to work by electricity—the great advantages of the new plan being, that in any number of clocks regulated by the same power, not the slightest alteration or difference of time will occur, while the expense will not come to more than one-third of the present price of clocks. Any number of clocks can be guided on the same principle; and as not one-hundredth part of a second of difference in time will be perceptible between them for a twelvemonth together, the benefit of this new invention, when perfected, will be particularly felt in large towns, in which there may be a number of clocks, public and private. Indeed, it is questionable if the principle of electricity can be made to bear with any profitable result in a place in which there are not a number of clocks, the expense of directing one or two on the system referred to, though perfectly practicable, not admitting of its execution. We understand that a patent for the invention is to be applied for. The electrical power for the working of the clocks is to be conveyed by wires, which will be made to branch off, much on the same principle as gas-pipes. The machinery in these clocks will, it is said, require no winding up.—The other invention of our indus-

trious countryman, to which we beg to call the attention of our readers, is what he calls the "Electrical Helix Printing Press." Our London correspondent, who has addressed us on this subject, seems persuaded that it will altogether supersede the use of telegraphs, as by means of it, intelligence can be printed in an instant at a distance of many hundred miles from the place from which it may be wished to convey it. In order to give some idea of the rapidity with which this press will be enabled to work, our correspondent adds—"Metallic wires are required to be laid between the places from which intelligence is to be conveyed and those at which it is desired to announce it, and provided a press be placed at each termination of these wires, and that they were made to extend, if you will, from London to Wick, any information could be conveyed from the one place to the other with a celerity which would set all previous inventions at defiance."

NEW ECONOMICAL LAMP.

The *Fanal*, Brussels paper, mentions a lamp which has been recently invented by M. Pélabon, which gives as much light as three candles, may be very easily used, and burns only a centilitre of oil an hour. This lamp consists of a cylinder of copper or tin, in which a piston slides, which is lifted up every five hours, and in descending raises the oil to the burner. It is acted on by a spring, to which M. Pélabon has found the means of giving an equal force at all points of its action. This is effected by compensation, the oil being made to drop on the piston, and so increase by its weight the downward force, as to produce an equivalent to what is lost by the spring in unbending. The cost of this lamp is stated to be about 30 francs. The *Fanal* says the burner is extremely small, but the light it affords is equal to that of three candles.

PERCUSSION SHELL TO EXPLODE AT THE BOTTOM OF THE SEA.

At a recent meeting of the Royal Society, the following description of a shell to explode under water, invented by Captain J. Norton, was communicated:—An iron tube, like the barrel of a musket, is screwed into a shell of any size, water-tight. A rod of iron, about half a pound in weight and a foot in length, is suspended within the tube, by means of a split quill passing through a hole in the upper end of the rod, the other end being armed with a percussion-cap. The mouth of the tube is closed with a screw lid, also water-tight. Tin or brass wings being attached to the upper end of the tube will keep it in a vertical position during its descent to the bottom of the sea; and the shock on its striking the bottom will cause the bar of iron within the tube to fall, and produce the percussion and explosion. Should it be found difficult to make the shell water-proof, I am satisfied that percussion powder made from silver will explode by friction or percussion even when *mixed with water*.

LITERARY NOTICES.

The Locomotive Engine Popularly Explained, by WILLIAM TEMPLETON. Liverpool: Egerton Smith & Co.

This small volume gives in a popular, and, at the same time, a very complete form, a description of the different parts of the machinery of a locomotive steam engine, and of its modes of application on railways. We seldom meet with a work containing, in so small a compass, so much useful and practical information as the pages of this volume contain. It is evidently written by a gentleman well acquainted with the subject on which he treats, and from his practical knowledge he is enabled to supply details and calculations that can be relied on in practice. The object of the publication, as stated in the preface, is to present, in a popular form, and in a shape accessible to all classes, a description of the locomotive steam engine, so that those who desire to acquire such information, may be able to attain it without being debarred by the expense of the larger works on the subject. It is offered as the result of several years' expérience in the locomotive department on a line of railway on which the author had constant opportunities of testing the merits and defects of the engines, and of their working on the railway; and the results of his experience are here compressed within one hundred pages. Mr. Templeton does not confine his observations to locomotives and their powers; he makes some useful remarks on the duties and responsibilities of those in whose charge they are placed. His opinions of the qualifications and duties of engine-drivers are thus expressed:—

"1st. They ought to be active, sober men, and not afflicted with any bodily ailment, as shortness of sight, deafness, fits, faintings, &c., whereby the lives of passengers are endangered beyond the reach of their control.

"2. They ought to be perfectly familiar with all the various parts of a locomotive engine, so that, by watchful care, they may be the means of preventing, in many instances, any particular loss or material expense that might occur with a person unqualified, and not knowing the result of delay.

"3. They ought to be men of strong nerve and affable manners, so that, if any accident occur to an engine, causing a stoppage on some desolate part of the line, they may, in a great measure, prevent dissatisfaction amongst the passengers, by their active endeavours and intelligent conversation.

"4. Their daily duties are, strict attention to their engines,—a careful look-out upon the line,—and punctual attention to the signals; whereby order is maintained and safety secured."

It will be observed, from the foregoing qualifications, which Mr. Templeton considers requisite, that he is disposed to institute a more rigorous examination into the capabilities of engine-drivers than is proposed by the railway department of the Board of Trade, previous to the granting of licences.

We cannot conclude our notice of this publication without expressing satisfaction at perceiving that our views, respecting the diminution of friction by rapid motion, have received the sanction of a gentleman of such great practical experience as Mr. Templeton, who has given a place in his book to our remarks on that subject.

The Year Book of Facts in Science and Art. London: Tilt and Bogue.

This manual of facts purports to contain an abstract of all the new discoveries, inventions, and improvements connected with science and art during the past year. It forms the third volume of an annual series in which this extremely useful object has been attempted to be carried out. A work of this kind, which places in view within a small compass a record of the progress of discovery from year to year, was much wanted. It of course does not possess originality; it is a record of facts collected from various periodicals (among which the INVENTORS' ADVOCATE has been laid under contribution), abridged in some instances, but sufficiently explicit to convey a general idea of the nature of the results. The industrious editor has thus collected five hundred abstracts of inventions and improvements during the past year. Inventive genius was never more actively alive than at the present time; and numerous as the collection is, we think it might have been even more extended. There are several wood-cuts to illustrate the subjects noticed. It is altogether a very praiseworthy effort to place before the public in a collected and amended shape the progress of science and art, which has been communicated in more evanescent forms during the past year, and will prove generally instructive and useful.

THE HYDRAULIC BELT KNOWN PREVIOUS TO 1783.

(To the Editor of the Inventors' Advocate.)

SIR,—In Vol. IV., page 58, of your Journal, you have given a paper transcribed from the *Annual Register* for the year 1783, describing a "machine lately erected by command of his *Majesty* at Windsor, for raising water out of a very deep well, to supply the Castle."

Now, Sir, I beg to observe, that this invention is of a much earlier date. "*The Rope Pump of Vera*," described in most books on hydraulics, consists of an upper and lower pulley, formed in the ordinary manner, but with *several grooves in each*,* in which endless ropes of very loosely spun horse-hair, or *wool*, are made to move with great rapidity, by a multiplying wheel, connected with the upper pulley. The lower pulley moves in the water, which is merely brought up by adhering to the *ropes*, and the rapidity of their motion.

This, therefore, is but a very imperfect and rude kind of bucket pump, and is by no means deserving the place it has so long held in the catalogue of Hydraulic Machines. (Library of Useful Knowledge, Art. Hydraulics.) Hence it appears that the only difference between this said new invention, and the machine of *Vera*, is that one is a continuous belt, and the other a series of detached ropes nearly in contact with each other; from whence I am inclined to question the advantage in favor of the belt. I have been informed that one side only of the belt is woolly; if so, I consider Vera's machine has the advantage.

In the working of these machines, there is, however, a certain velocity required in the motion of the ropes, or belt; so that their velocity, and the adhesion of the water thereto, is a maximum. For if the belt or ropes move too slow, the water will run down faster than the belt goes up; and if the motion of the belt is too quick, the velocity of the belt will overcome the cohesion of the water, which will consequently fall back again; not to mention the greater wear of materials resulting from a more rapid motion. I am, sir, your's respectfully,

Lynn, Feb. 15, 1841. JAS. UTTING, C.E.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(Contributed expressly to the Inventors' Advocate.)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING FEBRUARY 22, 1841.

Monday	Geographical Society	9 P.M.
	British Architects	8 P.M.
	Medical Society	8 P.M.
Tuesday	Medico-Chirurgical Society	8½ P.M.
	Inst. Civil Engineers	8 P.M.
	Zoological Society	8½ P.M.
	Royal Botanic Society	8 P.M.
Wednesday	Society of Arts	7½ P.M.
	Geological Society	8½ P.M.
Thursday	Royal Society of Literature	4 P.M.
	Royal Society	8½ P.M.
	Antiquaries Society	8 P.M.
Friday	Royal Institution	8½ P.M.
Saturday	Westminster Medical Society	8 P.M.
	Mathematical Society	8 P.M.

SOCIETY OF ARTS.

Feb. 10. *Hughes Hughes, Esq., V.P., in the Chair.*

(Continuation of Mr. Aikin's Lecture, part of which was inserted last week.)

In addition to the plants already alluded to, of the genus *Daphne*, as yielding fibre of a peculiar and

* For views of this machine, see Encyclopædia Metropolitana, Art. Hydrodynamics, Vol. III., plate VIII., fig. 47.

delicate texture, the *Daphne Nepalensis* of Nepal, is much employed in that country for the manufacture of paper. When prepared it is not very smooth; but it possesses advantages over that made in the ordinary manner, as it is not preyed upon by the *White Ant*, which destroys to an incredible degree documents in the East Indies; there is either some peculiar smell or taste obnoxious to this depredator. The natives of Otaheite make of the bark of the *Bread-fruit Tree*, &c., clothing, suitable for the temperature of the climate. In China and Japan the bark of the *Paper Mulberry* is made into their very best kind of paper: in its native state it is in streaked layers, and is sometimes dyed red and printed of various patterns, given to it by means of raised bats.

Mr. Aikin then proceeded to explain the history of *Flax* and *Hemp*. Linen and woollen cloth was known in the oldest times, and it is supposed that women were probably the first who wore linen robes, while men were clothed in woollen.

The fibre is obtained from the flax, *Linum usitatissimum*, by cutting the stems when the seeds are ripe, tying them in bundles, macerating them in water until the cuticle or epidermis is loosened, and then beating them with large bats to separate the fibres. This was the process adopted in ancient times, and is adopted up to the present day, with the simple improvement of boiling the stems in an alkaline solution, in order more readily to separate the fibres and to destroy the coloring matter. In the silk handkerchiefs obtained from India, the harsh fibre of the fabric depends on a portion of the natural gum which remains on its surface, and, to a certain extent, resists the edge of the knife; it is on this account that handkerchiefs of this kind are sought after by men-of-war's-men to tie round their heads in action, with the idea that it would prevent the infliction of a wound on that part of the body, should their opponent strike at it.

Hemp was likewise known to the ancients. All cordage used for rigging of ships, for twine, &c., is made of this fibre. It was formerly cultivated in this country to a considerable extent; much however is imported from Italy, the fibres of some kinds of which measure from seven to eight feet long. Italian hemp was, a few years ago, in low estimation in the market as compared to Russian and other kinds. It sells now for about £60 per ton. It is chiefly used for the manufacture of linen cloth in England, Ireland, &c., and is now rising in the estimation of the manufacturers.

Government, some years since, endeavored to cultivate hemp to some extent in Canada. Bombay furnishes hemp of good quality, sufficient for the uses of shipping in those parts. It is also grown in China:—a specimen was exhibited of a soft and very white color, obtained from those parts. Our shipping is principally supplied by the hemp imported from Russia. Many very superior specimens of this article were on the table, grown in our own country, and in the British dominions in foreign parts.

The common *Stinging nettle* (*Urtica*) is very nearly related (botanically considered) to hemp; the fibre obtained from it is good, and clothes have been made from it. A similar plant in Sumatra rises to the height of from 4 to 6 feet, and when cut down and prepared, yields fibre of excellent quality for most purposes.

The *Hopbine* of the common hop, after the strobiles have been picked, when macerated in water yields a *brownish* fibre applicable for many purposes. The principal objection to this material is the brown color, which is not easily discharged. Mr. Aikin thinks it would answer well for hop-bags, twine, and coarse cloth: it is harsh to the feel.

The *Sun hemp* of India is much cultivated for its fibres, which, when the plant is in seed, are of the greatest tenacity. The weaker fibres obtained from the several plants mentioned are of less price than the stronger, and are much used to adulterate the stronger hemp and flax.

The plants of the *Mallow tribe* (*malvaceæ*) are remarkable for the fibre of their bark. That separated from the *Hibiscus Cannabinensis*, when woven in India, is known as *Glass Cloth*.

The *Bowstring hemp* of India is obtained from the fibres of the bark of *Asclepias tenuissima*. It is made into bow-strings, cloth, &c., the strongest description is obtained from an *American Aloe*. (*Agave*.)

The leaves of the tribe of *Bromeliaceæ* yield a very strong and elastic fibre, such as that obtained from the genus *Agave*, or American Aloe, the fibre of which is long and clean. The white cables of Manilla are prepared of it.

The Sugar Pine of Jamaica yields a very fine fibre. Of the *Phormium tenax*, or New Zealand flax, much discussion has arisen on the degree of tenacity of the fibre of this plant as contrasted with the Russian article; by many it is considered inferior. It is said to be a very inferior article when manufactured into sail-cloth, as it absorbs water readily, and causes the fabric to rot much sooner. If boiled in an alkali this objection is partially removed. When examined under the microscope the fibre of cotton is observed to be very hollow; that of New Zealand flax more solid; and that of common flax appears to be manifestly composed of a congeries of small fibres, adhering together, thus accounting for its superior strength. The delicate fibre obtained from the *Musa*, or Banana, is nearly the finest of all the useful kinds, and, when manufactured, yields a cloth, cambric, or muslin, of better quality than any other. The leaves of some palms afford fibres firm enough for cordage, and others for baskets. The nut of *Cocos nucifera* is enclosed in a mass of fibres which afford the materials for the floating Kaya rope, the cables holding a ship in a storm for a much longer period than any other kind. Mr. Aikin will resume this subject on a future occasion. The subject announced for March 10, was—On the Mechanical Processes of Sculpture, by Mr. C. Smith.

ROYAL COLLEGE OF SURGEONS, LONDON.

On Monday last Mr. Callaway delivered the Hunterian Oration at this college to the most numerous and distinguished audience that we recollect ever attending on the occasion. The view which Mr. C. took of the subject was to trace the science of surgery from the ancient Egyptians up to the present period. Our space will not allow us to enter into details.

It is somewhat surprising that so extensive and increasing a body as that of the surgeons should not be provided in their college with more ample accommodation for members than the limited size of the theatre will admit of. Many were much disappointed at not having an opportunity of even catching a glimpse at the lecturer. The gallery it is true would afford room for many of those entitled by right to be present on this annual occasion, but it is usually filled long prior to the stated time by the pupils or non-professional friends of the lecturer, or of the school or hospital to which he belongs.

Sir Robert Peel, Sir H. Ellis, and others were present. We also noticed amongst the élite of the profession, Mr. J. H. Green, Mr. B. Travers, Mr. Liston, Mr. Thomas, and a host of others.

EFFECT OF SAND IN COMMUNICATING PRESSURE.

A Glasgow correspondent of the *Mining Journal* makes the following observations relative to the improved process of blasting, invented by Mr. Martyn Roberts, to which we have more than once alluded:—

"Sir,—With reference to the subject of blasting, are you aware of some experiments which were made a few years ago, in the United States, under the direction of a colonel of engineers, for the purpose of showing that the particles of loose sand in tubes communicate pressure laterally only? Thus, metal tubes, of the usual boring dimensions, inserted in heavy blocks of stone or wood, and filled with loose sand, resting on a soft yielding base, were found to open laterally, bursting the blocks which held them, in consequence of the application of heavy weights made to bear on the surface of the sand above; at the same time, that no particle of the sand below was displaced, or even its form impressed on the soft substances which constituted the base; from which facts, the result of numerous experiments, it would appear that no pressure from above is transmitted longitudinally through loose sand, of a certain columnar thickness, or, perhaps, it would be more correct to say, that the wedging arrangement which the particles of sand assume in the tube, neutralise the effect of any such pressure. This being the case, we have only to reverse the experiment, as it were, to account for the fact that, in blasting explosions, loose sand in boxes affords so powerful a resisting medium, increased, of course, by the vacant space alluded to in your extract of last week from the *Inventors' Advocate*, in which also the *rationale* of the cause of this increase is ingeniously given.

"It has occurred to me many times since reading the account of the experiments before referred to, that if loose sand be found on a small scale to resist downward pressure in this remarkable way, beds of sand, well supported—as by solid clay for instance—afford a good foundation to build on, notwithstanding the ancient prejudice which exists against such a basement; and the fact that, in New York and many other places, the heaviest structures are erected, as I understand, upon such natural deposits, of a tertiary or alluvial era, is sufficient to prove that I am correct in this opinion —and, further, that the practice of removing sand, to reach what is esteemed to be a superior substratum, is often not only unnecessary, but absolutely injurious to the superstructure."

INVENTION OF LITHOGRAPHY.

"The process of lithography depends on the facility with which some kinds of stone absorb either grease or water, and on the natural antipathy which grease and water have for each other. An even surface having been given to the stone, a drawing is made upon it with a greasy chalk. The stone is then wet, and the printer passes over it a roller covered with printing ink, which adheres to those parts only which are drawn upon with the chalk; a damp paper is then pressed upon it, and receives an impression of the drawing. Lithography was accidentally discovered about the year 1792 by Alois Senefelder, the son of a performer at the Theatre Royal of Munich. He was a student at law at the university of Ingoldstadt, and after his father's death tried a theatrical life, but without success. He then became an author, but being too poor to publish his work, tried various methods of writing on copper, in order that he might print them himself, and soon found that a composition of soap, wax, and lamp-black formed an excellent material for writing, capable, when dry, of resisting aquafortis. To obtain facility in writing backwards, as copper was too expensive, he procured some pieces of calcareous stone, which when polished served him to practice upon. His mother having one day desired him to take an account of some linen she was sending to be washed, he wrote it on a piece of this stone with his composition of soap and wax. It afterwards occurred to him, that by corroding the surface with acid the letters would stand out in relief, and admit of impressions being taken from them. He tried the experiment, and succeeded, and soon found that it was not absolutely necessary to lower the surface of the stone, but that simply wetting it was sufficient to prevent the printing ink from adhering to any parts except those which were marked with the composition. Such was the invention of lithography, and Senefelder continued to pay unremitting attention to the improvement of the art. In 1796 pieces of music were printed, and it was perhaps the first time that lithography became of real use. The difficulty of writing backwards brought about the invention of the transfer paper. In 1799 Senefelner took out a patent at Munich, and soon after entered into partnership with a Mr. André of Offenbach, who proposed to establish presses, and take

out patents in London, Paris, and Vienna. He came to London in 1801, with a brother of Mr. Offenbach, and communicated the new art, then called polyautography, to many of our best English artists, who tried it; but the continual failures through want of skill in the printing, and the difference between German and English materials, caused it to be abandoned. Having separated from Mr. André, Senefelder went to Vienna, where he tried to apply lithography to the printing of cottons, but apparently without success, and he returned to Munich in 1806, in which year the professor of drawing at the public school at Munich, Mr. Mitterer, succeeded in multiplying copies of his drawings for his pupils by lithography. He is also said to have invented the composition for chalk as now made. In 1809 we find Senefelder inspector of the royal lithographic establishment at Munich, and engaged in printing a map of Bavaria, and soon after invented the stone paper, which, however, did not succeed. It was exhibited in 1823 at London, by a partner of Senefelder, but its liability to crack by being wet and the pressure of the press rendered it useless. Little was done in England after 1806, till its revival in 1817, since which time it has been gradually improving, till lately it has acquired still greater powers by the means of employing a second stone, by which is obtained a perfect imitation of drawings made on tinted paper, having the lights laid on with white."—*From J. H. Fielding's Art of Engraving.*

EFFECTS OF THE WORM ON KYANISED TIMBER.

At a late meeting of the Society of Civil Engineers, a paper was read by Mr. J. B. Hartley, on the Effects of the Worm on Kyanised Timber, exposed to the action of sea water, and on the use of Green-heart Timber from Demerara, in the same situations. There are probably few ports in England where the inconvenience resulting from the attacks of marine worms (*teredo navalis*) on the timber of the dock gates and other works exposed to their action, is more severely felt than at Liverpool. The river Mersey has a vertical rise of tide of twenty-seven feet at spring, and thirteen feet at neap tides, and the stream being densely charged with silt, a considerable deposit takes place in the open basins, and to some extent in the docks. The latter are cleansed by means of a dredging machine; but the former are usually "scuttled," for which purpose sewers connected with the docks surround the basins, having several openings furnished with "clows," or paddles, so that the rush of water from the docks may be applied for clearing away the mud from any particular part of the basin. The security of these paddles is, therefore, of the greatest importance, as the failure of one of them might, by allowing a dock to be suddenly emptied, cause great damage to the shipping. These paddles have been usually constructed of English oak or elm, and being much exposed, they suffer from the attacks of the worms. Cast-iron paddles have been tried; but in consequence of the rapidity of the corrosive action, they soon became leaky and were abandoned. Kyanised oak timber has been tried on the backs of these paddles, and found to be perforated by the worm in the same time as unprepared wood. Some oak planks, two inches and a half thick, Kyanised at the company's yard, were used on the west entrance gates of the Clarence Half-tide Basin, and in fourteen months were completely destroyed. Several similar instances of the non-efficiency of the Kyanised timber are given; and the author proceeds to designate the timber which resists best in such situations. He considers that teak is less liable to injury than English woods, and instances the inner gates of the Clarence Dock, Liverpool, which have been built for ten years, and at present are but slightly attacked. The timber which he prefers for dock works is the Green-heart. It is imported from Demerara, in logs of twelve to sixteen inches square by twenty-five to forty feet long, and costs about seven shillings per cubic foot. Of its power to resist the attacks of worms, he gives many proofs: one of them may be cited. At the first construction of the Brunswick Half-tide Basin, several elm clows were placed at the west entrance; these were destroyed by the worms in two years; and were replaced by others made of Green-heart; the joints of the plank being tongued with deal to render them completely water-tight. These clows have now been down about seven years, and, although the deal tongueing has been destroyed by the worms, the Green-heart planking remains untouched and perfectly sound. Many methods of protecting common timber have been tried; but the only successful ones adduced are—1st, the use of broad-headed metallic nails driven nearly close to each other into the heads and heels of the gates, but if driven an inch apart the worm penetrates beneath them; and, 2dly, steeping the timber in a strong solution of sulphate of copper from the Parys Copper Mines in Anglesea. Some paddles made of English elm thus prepared had been in use upwards of three years, and, on an examination, were found to be very slightly injured, while the unprepared timber about them was quite destroyed. The author observes, that the outer gates of the wet basins are most injured by the worm, from the sills being low down, and the change of water every tide assisting the growth of the worm. Those parts of the gates which are alternately wet and dry are more injured by the worm than the parts immersed always in the same depth of water. At the spot where a leak occurs from a bad joint, a defect in the caulking, or other cause, the worm commences its attack; so that the most incessant attention is required. Those basins into which the sewers of the town discharge themselves are comparatively free from the worm, from which it would appear that sulphuretted hydrogen gas acts in some measure as a protection against the attacks of the worm.

EXPORTATION OF MACHINERY.

In the House of Commons on Tuesday night, Mr. Mark Philips, the member for Manchester, moved for the appointment of a select committee to inquire into the laws relating to the exportation of machinery. He stated that the operation of those laws had long been a subject of complaint; that they had long interposed a serious and almost insurmountable obstacle to the exercise of skill and capital; that the repeal of them was earnestly desired both by the master manufacturers and the workmen in their employment, and that frequent petitions to that effect had been addressed to the house. The combination laws were repealed; the laws interfering with emigration had also been abrogated; and a committee of that house, which sat in the year 1824, had recommended that the laws affecting the exportation of machinery should be made the subject of further inquiry. The committee of 1825 said, that though they were of opinion that tools and machinery ought to be regarded in the same light as other manufactures, yet, as circumstances might arise calculated to afford just ground for prohibiting to some extent the exportation of machinery, they recommended that until a general alteration could be effected in the laws relating to this branch of commercial intercourse, the export should be regulated by the authority of the Privy Council. The hon. member next referred to the known sentiments of Mr. Huskisson upon the subject, who had expressed himself favorable to direct legislation. Mr. P. Thomson, now Lord Sydenham, in the year 1833 introduced a Customs Regulation Bill, which gave permission for the exportation of tools under licence from the Board of Trade. Our artizans were at liberty to emigrate, our manufacturers were permitted to send abroad a great variety of tools—we might export steam-engines and parts of steam engines—all that might be called the elementary or preparatory parts of machinery might be sent abroad without the least restriction; but the exportation of machinery in an entire state was prohibited, as he apprehended, to no useful purpose, for, as the several parts could be sent abroad, our rivals in trade were enabled to enjoy the full advantage of our skill and ingenuity in the manufacture of machinery, and to apply the mechanical aid which they received from us to any or all of the four great staples of this country—namely, wool, flax, cotton, and silk. To show the vast increase which has taken place in the manufacture of machinery between 1831 and 1840, he stated, from a return on the table of the house, that in the former year the value exported was £60,028, while in 1840 it was £387,096. It was quite natural that we should hesitate to place within the reach of foreigners those results of our ingenuity from which we derived so many advantages; yet, as foreigners now enjoyed all those advantages surreptitiously, it did appear to him that we had much better give a legal sanction, and no longer continue a system which reacted upon ourselves. Fifteen years had elapsed since the subject came before that house, at least since there had been any Parliamentary inquiry, and within that period we had made a greater progress in the mechanical arts than other countries had made in centuries. For these, among many reasons, he thought that the inquiry ought to be granted. At an expense of 25 per cent. steam-engines might be exported. There had been instances of the machine called spiral cutters being sent abroad under the denomination of chaff-cutters, and one manufacturer who asked for a licence to export some tools, on being refused it, said that he could send them to their destination within the next 24 hours without the leave of the Government. The quantity of tools exported within the last few years was equal to that supplied by eight or ten of the largest machine-makers; and this large quantity afforded foreigners an opportunity of competing with the English machine-makers, who were unable to export to advantage from the roundabout mode they were obliged to pursue. Large machine establishments were springing up in different parts of the Continent, and some of the most important inventions which had been brought from America to this country, had been also carried to the Continent. What he had stated showed the inconsistencies with which they were at present surrounded. Hitherto his (Mr. Philips's) opinion had been in favor of some restriction, if such could be made available and *bonâ fide*; but he thought the statements of the machine-makers were well worthy of the consideration of the house. When the former attempt was made to legislate on this subject, the manufacturers objected to it. They apprehended that there would be a great demand for machinery, and that the cost of machinery would thereby be greatly enhanced to our manufacturers. The period when this objection was raised was 1824 and 1825, when every article of manufacture was raised in price, in consequence of the state of the currency, and it was true that many mills and factories were erecting in different parts of the country; and such was the demand for machinery, that 18 months would elapse before it could be supplied. The manufacturers also laid great stress on the argument, that in former times, Scotland imported manufactured goods from Leicestershire and Lancashire; but that Scotland having good machinery of its own, did not now want English goods; and they drew the inference that, if the restrictions on the export of machinery were removed, foreigners would do as Scotland had done. Perhaps this apprehension was not altogether groundless; but the committee would call upon both parties to state the result of their experience, since the last inquiry, with reference to the changes in the relative state of this country and the Continent.

Mr. E. Tennent seconded the motion. The result of a committee would be, that the Legislature must either abandon the prohibitory system or alter the ineffectual laws made for its protection. As an illustration of the inconsistency and inoperative nature of the existing laws, Mr. Tennent said, the necessity for further legislation upon this subject had been mainly caused by the crude and clumsy arrangements which were made by Mr. Huskisson himself for the administration of the law in 1826. A discretionary power was vested in the Board of Trade to permit the free export of certain ma-

chinery, whilst others were to remain under prohibition, and for the guidance of that discretion Mr. Huskisson stated in the House of Commons, that he had laid down the following principle, the wisdom of which it was difficult to discern,—"That when machinery was of great bulk, and contained a great quantity of raw material, then no objection should be made to exportation, as he considered that no injury could be done to the country by it; but where the machinery was of modern improvement, and depended mainly upon the ingenuity and excellence of the mechanism, and when the raw material used was trifling, he felt that he owed it to the manufacturer to restrain as far as he could the exportation of such machinery." Thus the Board of Trade, with, of course, but an imperfect knowledge of the construction of machinery, were to dispense with all considerations of rarity, ingenuity, and performance, and to look mainly to weight of metal, and he had understood that the standard practically taken was to allow such machinery to pass as was driven by a screw of one inch and a half in diameter. The most ingenious pieces of mechanism thus found their way through the Custom-house, if they were only heavy enough; and amongst other fomidable errors which were committed in accordance with the theory was the unlimited export of tools. The importance of the concession would be perceived when it came to be known that under the name of tools the most complex and wonderful machines were permitted to be exported, because they were to be used for the production of other machinery, and not of any articles of commerce. These tools are in fact machines—not only so, but they are the most valuable of all our machinery, because they not only produce it, but confer upon it its precision, its finish, and its excellence. Some of these tools are of enormous size, planing machines of 20 to 30 feet in length, drills of corresponding dimension, and lathes that grasp a beam of iron that it would have taken weeks to polish by hand labor, and turn it out in a few hours as smooth and as delicately finished as an ivory toy. Operations, in short, which were once achieved after long labor with the file and the hammer in the hand of the workman, and liable to all his inaccuracies and defects, are now performed by tools that act like automatons, combining with gigantic power a precision that is faultless, and an ingenuity that approaches to instinct. Foreign countries now possessed our tools, our coals, and our artizans, and with these means were rising fast into rivalry in the manufacture of machines. That rivalry had been spurred by our prohibitions. He admitted, however, that the subject involved some doubts. Foreigners were sparing no expense to get English machinery for the purpose of opposing our manufacture of cottons: that was a consideration of some difficulty; it was giving up the start which we now had. But as it was clearly impossible to work out the existing law, it had become indispensable to inquire by a committee.

Mr. Sheil, on behalf of the Board of Trade, signified the accession of Government to the motion.

Mr. Hume took credit for having been the means of repealing the combination laws, and the laws which prohibited the emigration of artizans. The committee moved for by him some years ago had recommended, in addition to those repeals, the measure now proposed; but it was then stifled by the opposition of the manufacturing interests. The result had been, that masters were now abroad, conducting manufactories there, which they would much rather have established at home. He thought no new committee necessary, the evidence before the old one was sufficient; but he would not oppose the motion. As an instance of the absurdity of the the present laws, he told the house, that though it was illegal to export a screw, it was not illegal to export a machine which would make 1,000 screws.

Several other members connected with trade and manufactures supported the motion and the committee was appointed.

OBSERVATIONS ON THE PRESERVATION OF ANIMAL SUBSTANCES.

BY DR. WILKINSON, BATH.

A few weeks since I submitted to the public an account of the dreadful results of animal substance taken into the stomach in a decomposed state, at Wurtemberg; and in that small district many hundreds have fallen a sacrifice within the last two years, by feeding on a species of German sausages, and it is much to be apprehended that a similar article in this country is frequently composed of putrescent materials, and, in warm weather, it cannot be too strongly impressed on every person's mind to be extremely cautious as to all animal substances, whether potted or enclosed in skin. The same observations are applicable to the continental substitutes for isinglass. Our Gallic and Germanic neighbours fancy that John Bull's stomach is competent to digest every thing. It may be advanced as an argument for the sale of such substances, that a considerable portion of animal substance would be lost, particularly in warm weather, if such a mode of preservation were not adopted. It is surprising, that the admirable mode of not only preventing decomposition in animal substance, and also of improving its quality, both as to taste and nutrient matter, which was many years since imparted to the public by H. Sockett, Esq., late of Swansea, now a resident in Bath, has not been generally adopted. This process, requiring a very small proportion of salt, is particularly well calculated for pork, beef, and fish, and without any limitation as to time, combining improvement with economy. The preserving material recommended by this gentleman, is the weak pyroligneous acid the results of the first distillation of wood; and, at this gentleman's recommendation, it is now manufactured at the Pyroligneous Establishment in Wales, under the name of "Smoke Acid." In principle it is the same, in a purified state, as arises from ovens heated by wood.

To produce this acid, about a ton of wood is introduced into an iron retort, in some respects resembling the coal gas apparatus; in general the cylinders are about five feet in diameter, and bound with Stourbridge bricks; each charge of dried wood gives out about 70 gallons of weak acid, a portion of naptha floating at the top, and wood tar at the bottom; the acid liquor is easily separated, and the distillation occupies nearly 24 hours. Fish pickled with this acid, requiring a very small portion of salt, at the end of twelve months, when cooked, has all the agreeable qualities of fresh fish; and I believe most persons accustomed to what is termed smoke-dried bacon and ham, are pleased with the flavour; the fat never appears white and tallowy, but preserves its natural healthy color, free from every particle of rancidity. To tongues, hams, and pork, it imparts a delicious flavour; and all persons possessing extensive plantations of brush-wood, could, at very little expense, prepare this acid. The manufacturers are supplied with this wood at about 5 or 6 shillings per ton, each ton yields 70 gallons of acid, and about one third of its weight in excellent charcoal. A second excellent plan has been brought forward by a very respectable friend of mine, a Mr. Payne, at the Colliseum, Regent's Park, and which, in point of preserving meat upon the usual principles, is more expeditious, and in hot weather, of the highest importance in the preservation of animal substances: the process is very simple. It is well known, that in all atmospheric temperatures above 60 degrees, meat of every kind does not readily combine with salt; this preserving material will not readily penetrate the animal substance; this occasions great loss, frequently, to large provision houses. Under any atmospheric temperature he has ascertained that, if the air diffused through meat, placed in the usual saline pickle, be removed, afterward, by the process of condensation, the saline fluid is pressed through every part of the animal substance, that the preserving combinations follow, and a slight process thus terminates all the trouble. Some months after preparation I have eaten some mutton, equal in flavour to any mutton or ham. This process, adopted at very little expense, would enable every butcher to prevent the great losses he is exposed to by decomposition in very hot weather.—*Bath Journal.*

NATIVE IRISH MINERAL PAINT.

A red substance, well adapted for a pigment, has been lately discovered, at Drumrankin, near Ballymena, county Antrim, on the estate of Lord O'Neill. The analysis, by several eminent chemists, points it out as well suited for all kinds of work exposed to the action of the weather. Dr. Apjohn has determined its composition to be :—

Silex	56·40
Alumina	3·46
Peroxide of iron	24·14
Carbonate of Lime	·90
Water	15·10

Dr. A. remarks, that the silex is present not as sand, but in an impalpable form, from its extremely minute state of division, and freedom from gritty particles. This not only renders it valuable for painting, but makes it fitted for several other purposes, such as polishing the mirrors of telescopes, and burnishing of fine works in steel, for being applied to razor straps, &c.

It has been employed for painting the exposed wood-work of the Queen's stores at Donaghadee; and Lieut. Davis, of the coast-guard service, certifies in its favor, from having superintended its employment there, and also testifies its fitness for iron work. Under Mr. M'Arthur's inspection, it has been used for imitations of mahogany, oak, and rose-wood; and, when mixed with gum water, it has been applied by him to color maps, with as good an effect as the best London water colors.

At the spot where this substance is found, the surface is stiff clay, not very productive, of a yellowish red color. At a depth of about two feet, the color gradually changes, and the superficial soil passes into a friable rock, of a mealy appearance, having a brownish base, mixed with white spots. This rock is very smooth to the touch, and presents no change of character for forty feet—to which depth Mr. M'Arthur caused a pit to be sunk—except the increase of whitish, and decrease of brownish matter. It then became rather of a slaty, greyish appearance, with a slight purple tinge, changing to a dirty green color; and hard corroded pieces of this color were found imbedded in the softer matter. Going lower, this hard matter increased in quantity until it predominated over the soft. The color of the surface of the rock now became black, but the fracture was greenish—lastly, the color became black throughout, and both the last varieties were so hard as to require blasting. Under this black variety was found the red substance now recommended as a pigment, first appearing as a dirty red clay, mixed with a white matter, similar to that described as appearing at the surface, only being more soapy and compact. These white particles soon disappeared, and the color turned to a clear light red, with smaller brown pieces, which were much harder than the rest of the mass.

About eight miles from the pit, and two from Lough Neagh, near the road leading from Randalstown to Toome, the same substance is found. It is possible, therefore, it may exist in all the intermediate space, and may pass under the lake. In conclusion, it may be mentioned, with respect to the black rock, that very intense heat appears to produce no effect upon it, except in changing its color to a brown or umber. It might consequently, be employed with advantage, in the construction of ovens or furnaces; and as it is found in square masses, it could be easily worked for the purpose. —*Northern Whig, published at Belfast.*

SCIENTIFIC MEMORANDA, AND NOTES ON ART.

Hydraulic Belts.—A correspondent of the *Liverpool Mercury*, alluding to the hydraulic belt as an old invention, observes :—" Fifty years ago many and oft have been the times I have raised water from the well, by what is now called the hydraulic belt; at that period that method of raising water was common in many parts of my native c untry—Perthshire. When or by whom it was introduced I cannot say, but I can recollect that the old women, who had been long accustomed to its use, did not look on it as a novelty; but it now appears to be an extraordinary one to the *learned philosophers* of the metropolis. The rope used was what is called a hair-tether, formed of horse hair; one which, in my opinion, from its durability and openness of texture, was the very best that could be adapted to the purpose."

The Tegumentary Organs of Animals.—Every hair of the human body, every distinct fibre of the wool of sheep, is provided with two glands pouring fluid into the follicles; but whence is hair derived? Its structure is most complicate, as also is that of horn, of the scales of the outer skin or epidermis, of wool, of bristles, &c., for all have a like origin, and are similarly developed. Each is merely a modification of the other; and a human nail is nothing more than a flat hair. First nuclei of soft gelatinous substance are observed, and their successive changes evince distinct existence; in short, they are animalcules, organic beings, fulfilling the functions of their ephemeral existence. Within the cells of these primitive germs which are stated to be organic beings, have been detected, as in the coloring matter of the tadpole, other organic beings parasitical to the former. The pigment cells of the tadpole, as also the sources of the negro's color, are now considered to be parasites of the organic beings composing the epidermic scales.—*Dr. Grant's Lecture at the Royal Institution.*

Receding of the Sea.—The *Phare de Rochelle* states, that the sea is receding so rapidly from the bay of Bourg Neuf, that the remains of an English ship of war mounting 64 guns, which was lost on an oyster-bank called Les Retraites des Œuvres, whilst in pursuit of a French ship in 1752, is now to be found in the midst of a cultivated plain. In calculating the depth of the water where this vessel struck with its present level, it will be found that the depth of the sea has diminished at least 15 feet.

Phenomena of Light.—At a recent meeting of the Royal Society, the supplement to a paper "On the Theoretical Explanation of an apparent new Polarity in Light," was read by George B. Airy, Esq., M.A., Astronomer Royal. In a paper published in the second part of the Philosophical Transactions for 1840, the author explained, on the undulatory theory of light, the phenomena observed by Sir David Brewster, and apparently indicating a new polarity in light. That explanation was founded on the assumption that the spectrum was viewed out of focus; an assumption which corresponded with the observation of the author and of other persons. But the author having, since the publication of that memoir, been assured by Sir David Brewster that the phenomenon was most certainly observed with great distinctness when the spectrum was viewed so accurately in focus that many of Frauenhofer's finer lines could be seen, he has continued the theoretical investigation for that case, which had been omitted in the former memoir, namely, when the spectrum is viewed in focus; and he has arrived at a result, which appears completely to reconcile the seemingly conflicting statements, and to dispel the obscurity in which the subject had hitherto been enveloped.

Stammering.—The German papers mention a discovery of Professor Diefenbach, which is exciting general attention at Berlin. He has discovered a method for the cure of stammering, by an incision in the tongue—which is said to have been in all the instances where he has operated, completely successful. According to the Professor, stammering proceeds from the difficulty of applying the tongue to the roof of the mouth, and his remedy of course consists in the removal of the impediment.

Earthquake.—Letters from Naples state, that on the night of the 4th-5th instant, the town of Reggio was ravaged by an earthquake, which has destroyed the cathedral and five other churches, three chapels, the palace of the provincial government, the Palace of Justice, besides many other public buildings, and nearly all the private houses in the town. Not more than ten or a dozen lives are known to have been lost, but about three hundred persons were wounded; and the inhabitants were driven out, amid the inclemencies of the season, to such shelter as tents and cabins, hastily constructed could supply. Shocks of earthquake were felt, at the same moment, in Messina, which have likewise done considerable damage; and the calamity has been attributed to the failure of the cruption which has been so long expected from Vesuvius, but all symptoms of which have recently and suddenly disappeared. Subsequent letters speak of shocks in various other places.

Sir Humphrey Davy's First Apparatus.—The late Sir Humphrey Davy began his extraordinary discoveries in a very petty way; for while a youth, and the apprentice of an apothecary at the Land's End, he with a few gallipots, crucibles, and a retort or two, either in his garret or by the kitchen fire (when the cook could spare it), commenced a series of chemical experiments which, in their result, have immortalized his name; and to the science of agriculture he gave shape, and character, and light, which it never possessed before.

Effect of Cold on Old Persons.—The effect of cold on the aged is strikingly evinced by the tables of mortality for 1838, as the following statement will show, of deaths in the metropolis :—

	Winter.	Spring.	Summer.	Autumn.
Total deaths	15,611	13,109	13,379	12,581
Old age . . .	1,383	969	778	981

Royal Scottish Academy.—The fifteenth exhibition of the Royal Scottish Academy opened on Wednesday in the Royal Institution Rooms, on the Mound. It is unquestionably superior to that of any former year, as, in addition to the magnificent pictures by Wilkie, Etty, Maclise, and other masters, it presents a manifest improvement on the part of many of our local artists.—*Scotsman.*

Horticultural Society.—The ordinary meeting of this society was held on Tuesday afternoon, Sir Charles Lemon, Bart., V.P., in the chair. Several presents were announced, and a short communication was read from the President on the culture of rhododendrons. A report was next read of some experiments made at the gardens of the society on the effects of wood prepared with a solution of corrosive sublimate when employed in hot-houses or drains, the results of which proved that such were totally unfit for horticultural purposes, unless painted or used in low temperatures. Many interesting experiments were adduced proving that under the influence of mercurial exhalations the plants soon faded and died, whilst they were immediately renovated when removed into an atmosphere of muriatic acid gas. The show was very limited, but there were some flowers of the powerfully scented chimonanthus fragrans, which flowering at the beginning of January, had this year been retarded by the coldness of the season. The fruit consisted of the Easter beurré and heurré rauce pears. From Mr. Mills, of Gunnersbury Park, was a brace of very fine cucumbers, principally exhibited in order to show how these might be raised in perfection under any adverse circumstances. The show of flowers was good and contained some new and rich epiphytes and orchidaceous plants. The extract from the meteorological register kept at the gardens from Feb. 2d to the 16th, gave, barometer, highest Feb. 2d, 30,093 inch., lowest Feb. 19th, 29,081; thermometer, highest Feb. 14th, 52 degrees F., lowest Feb. 3d, 14 deg. F., and quantity of rain 0·28 inch.

Comparative Cost of Artificial Light.—One pound of tallow candles will burn, on an average, fifty hours; the light from them, thergfore, is equivalent to that from fifty candles burning one hour, and costs sevenpence. An imperial gallon of sperm oil, in an argand lamp, burns 104 hours, yielding a light equal to five candles; the total quantity of light being that of 250 candles for one hour, and costing 7s. 6d. Five cubic feet of well-purified gas, in an argand burner, affords a light equal to twelve candles during one hour, and its cost is 1·20th of a shilling, or rather more than a halfpenny.

Coal Mine of Extraordinary Depth.—We understand that the miners engaged in sinking a shaft on the land of T. J. Trafford, Esq., near Patricroft, have at length, after a labor of nearly three years, found a vein of coal at the extraordinary depth of 1,350 feet from the surface of the earth. The land in question is leased to a company, who took it from a conviction that there was coal beneath, and their enterprise has at length been rewarded by the discovery of a vein of coals said to be about six feet thick, of a bright description, adapted for manufacturing purposes. We have been told that the first piece of coal attempted to be raised was about 30 cwt., but it broke in ascending the shaft. The remainder, however, when brought to the top, was still of extraordinary size, and has since been presented to the owner of the land. A mine was sunk at the Fenton Park Colliery, in 1818, to the depth of 1,030 feet, but we have not heard of a shaft before equal in depth to this.—*Manchester Times.*

VARIETIES.

Private Bills.—The number of private bills introduced in the House of Commons this session amounts to sixty-two. The proportion of railway bills is not so great as usual; they amount to only twenty-two. The diminution in the number of applications to Parliament for the extension of railways, was of course to be expected; as acts have been already obtained to form railroads on all the most important lines of traffic.

War Steamers.—A correspondent of an evening paper asks why our steam vessels of war are fitted with engines of power so inferior to those in use on board merchant steamers. "I observe," he says, "that the tonnage of the new war steamer Driver is 1,400, and her steam power 280 horses. The tonnage of three steam-vessels in the employment of the Peninsular and Oriental Steam Navigation Company, which I select from an advertisement in your paper of January the 25th, is in the following proportion to their steam-power:—Liverpool, 1,540 tons, 464 horse-power; Tagus, 782 tons, 282 horse-power; Braganza, 687 tons, 260 horse-power. I can certify, from experience, that the latter has none to spare"

Machines for Sweeping Chimneys.—It will be seen from the following extract of a letter from Mr. Glass, of London, to a gentleman of Sheffield, that machines are finding their way into the country, so that we may shortly anticipate an entire superseding of the use of Climbing Boys:—"Last week I was in the neighbourhood of Birmingham, and met with complete success in trying the chimneys at the residence of Lord Lyttleton, Hayley, which were considered impossible to be done with the machine. Your proposal of sending a competent person with a machine as a pattern, through the country, will be considered by the committee. I am receiving letters from several large towns.—*Sheffield Iris.*

Steam-boat Collision.—On Saturday last her Majesty's steamer Firebrand was towing a new steam-ship, called the Ardent, lately built at Chatham, up the river Thames, when she came in contact with the collier brig Earl Grey, lying off Limehouse, and carried away her bulwarks and stanchions on the starboard side. The Firebrand lost her stern boat, which was crushed by the collision. The Ardent is one of the new war-steamers which will add so materially to the strength of our navy, and is taking in her engines and machinery from the factory of Messrs. Seaward and Co., of Limehouse.

Mr. Snow Harris's Lightning Conductors.—In the House of Commons on Thursday, an address to the Queen, having for its object, to grant a reward to Mr. Snow Harris, for his plan of protecting ships by lightning, was agreed to. The government, however, gave intimation of opposing any grant of the kind.

Coal in India.—The earliest authentic information which exists of the consumption of Bengal coal is derived from the archives of Government. It appears that about the year 1774, Mr. Heatley, who was employed in some political capacity in the district of Beerbhoom, and was engaged in making settlements of land revenue in and about Ramghur, sent down about 2,000 maunds to the arsenal from a place called Aytura, in the Beerbhoom district. This village was situate about four miles north of the Drummooda, and two east of the Baracan; the spot where the excavations were made is still visible near the village. The coal, however, was not approved of; a second despatch was made, and then the supply ceased, and the mines were overlooked for more than 40 years. In 1815, Mr. Stark commenced operations on the Sylbet coal; but the experiment was abandoned after it had been continued for two years. Inquiry has again been made of late for this coal, as it is far superior in quality to that of the Drummooda; but the cost of transport, and various local and apparently insurmountable difficulties have prevented its being brought into competition with the cheaper article now used in Calcutta. The attempt to open the Sylhet colliery gave a fresh impetus to inquiry, and attracted attention to the long-neglected mines of Burdwan. In 1816 they were again explored, and a regular establishment for working them was formed by Mr. Jones, a man distinguished by the originality of his character and the boldness of his enterprises.—*East India Magazine.*

Importance of New Products.—Speaking of natural products, those employed by the natives of India might, if better known, be usefsl also for the manufacturers of England, and thus serve to increase the commerce of both countries. Many of these come under the denomination of drugs; and we learn from Mr. Larpent's evidence before the House of Lord's committee, March, 1840, that those coming from India are generally thought in the mercantile world to be inferior to the drugs imported from other parts of the world. That the great object of merchants connected with India is to encourage them in the English market, and to and to improve their qualities. But to this there are great difficulties in the high duties which are imposed on their introduction into this country; and as Mr. L. informs us, that the answer merchants get when they urge their correspondents to improve their qualities is, "Your duties are so high that it is of no use to attempt to improve them."—*Essay on the Productive Resources of India, by Professor Royle, F. R. S.*

Shipping Trade of Glasgow and Greenock—The trade of many ports in Scotland seems to be steadily advancing. As an instance of this we may take the returns of Greenock and Glasgow. In 1839, 222 ships, comprising 66,412 registered tons, entered the port of Greenock, while in the year just closed, the inward entries were 306 vessels, and 100,039 tons, being a surplus of 84 ships and 32,627 tons. The departures for foreign ports in 1839 were 182 ships, comprising 55,869 tons, while 241 ships, and 75,292 tons, left in 1840, being an increase, during last year, of 59 ships and 19,423 tons. The increase in the timber trade, during the last year, has been very great. The number of vessels arrived at Glasgow from abroad last year was 228, and the tonnage 42,782. The Greenock arrivals amount to 306 vessels and 100,039 registered tons, being an excess over Glasgow of 78 ships and 57,257 tons. The foreign trade of both ports has increased—that of Glasgow by 107 vessels and 23,896 tons, and that of Greenock by 84 ships and 33,627 tons. The trade of the Clyde, as a whole, seems to be in a most flourishing state.—*Glasgow Chronicle.*

Conspiracy to Defraud the Midland Counties Railway.—A conspiracy to defraud this company of the sum of £225 was attempted this week in Leicester under the following circumstances:—A short time since it had been found necessary to affix a notice in the office of the railway, stating, that in order to guarantee the safe delivery of money parcels, a per-centage on the amount, in the shape of an insurance, would be required. A youth, of the name of Richards, a cripple, and formerly a clerk in a respectable coach-office in the town, called at the parcel-office of the company with a small parcel purporting to contain £225, and addressed to a farmer in Derbyshire. He tendered the amount of insurance on the parcel, for which the clerk in the office gave him a receipt. The porter of the railway company happening to call at the time, the parcel was handed over to him. He said that the parcel should be opened there, or at the company's office. He accordingly opened it, when it was found to contain nothing but a letter enclosing tow pieces of waste paper. The letter which, with the address on the parcel, was in the handwriting of the youth, purported to

be from a person of the name of Biggs, in London. It stated that the money alleged to be enclosed was in requital of kindness formerly done the writer by the farmer in Derbyshire, and that on receipt of it a letter in acknowledgment should be directed to a person named Walker, post-office, Leicester. The youth Richards was taken into custody, and underwent an examination before the borough magistrates. He made an unreserved disclosure of the entire transaction, and has implicated two other persons in this conspiracy, at whose instance, he said, and for the consideration of a sovereign, he had been induced to attempt this fraud. From the disclosures made by the youth, one of the parties has been apprehended; he is a job-smith, and a leader of the Chartists in the town. He too underwent an examination, when his identity was fully established as a party concerned, and he was held to bail to take his trial for the offence.

ADVERTISEMENTS.

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SCIENTIFIC PERIODICALS.

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Chambers' Information for the People.	Mining Journal.
Civil Engineer and Architect's Journal.	People's Magazine
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Lancet.	Railway Times.
Law Magazine (Monthly).	Railroad Quarterly Journal.
Legal Observer.	Repertory of Arts.
Literary Gazette.	Spectator.
London Journal of Arts.	Smallwood's Magazine.

ACTS OF PARLIAMENT.

Patterns,—
27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17. (The last relates to patterns and *models*.)

Patents for Inventions,—
2 and 3 Victoria, c. 67.

Sculptures,—
38 Geo. III., c. 71.

Engravings,—
7 Geo. III., c., 38; 17 Geo. III., c. 57.

Copyright,—
8 Anne, c. 19; 12 Geo. II., (Booksellers' Act), c. 36; 5 Geo. III. (Universities' Act), c. 53; 54 Geo. III. (General Copyright), c. 156.

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THE

INVENTORS' ADVOCATE,

AND JOURNAL OF INDUSTRY;

A WEEKLY BRITISH AND FOREIGN MISCELLANY OF

SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

FIAT JUSTITIA, RUAT CŒLUM

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ROTARY AND RECIPROCATING ENGINES.

After innumerable trials and failures to produce a rotary steam-engine that would economise the use of steam, and simplify the machinery employed, the question has now arisen, whether, after all, the present reciprocating plan of working be not near perfection, and whether it does not produce as much working effect from a given quantity of steam, as the same steam is under any possible circumstances capable of producing. The communication of rotary motion by the crank, is viewed by some engineers as an admirable contrivance, possessing inherent virtues, which adapt it peculiarly to give efficiency to reciprocating engines. The quantity of work done by these engines is also advanced to prove that there is no power lost by the crank action, and that no advantage could be gained by applying the action of the steam in giving a direct rotary motion.

If these assertions were established facts, there would be an end to all further endeavors to invent a rotary engine, and that object, which has been so long desired, and so much sought after, must be abandoned. Before, however, we give up the point, let us examine the foundation of these assertions, and see whether reciprocating engines do not of necessity lose a great amount of power; and whether the calculations of the amount of work from a given quantity of steam are not based on erroneous notions of what the power of steam really amounts to.

The first and most obvious loss of power in reciprocating engines is occasioned by the constant stopping, and reversing the motion at the end of each single stroke. The whole momentum of the piston and the beam is thus checked and lost, and it has to be brought again from a state of rest into motion, with an exertion of fresh power, to be again checked and renewed.

Now, unless the whole theory of mechanics be wrong, here must be a constantly recurring waste of power by the stop put to motion, and the renewed action. We grant that in the larger engines, where the motion is slow and the steam is used expansively, this loss may be much reduced, if not altogether compensated; but in all locomotive engines, whether marine or carriage, but especially in the latter, the loss of power from these constant rapid checks to the motion of the piston must be enormous. The next source of loss arises from the action of the crank itself. In converting the rectilinear into a circular motion the power is never exerted at right angles, excepting on the two points where its action is injurious rather than beneficial, that is, at the bottom and top of each stroke. In every portion of the circle described by the crank, the piston-rod communicating with it acts to disadvantage. The loss of power in this respect is greatest towards the upper and lower parts of the circle, and it is in those points that the piston-rod acts with the greatest power, as the steam is then let in with its full expansive force. There is a composition of pressure and motion continually going on during the whole action of the crank, for the direct action of the force is in a tangent to the curve; and its re-action tends to push the piston-bar on one side. We see, therefore, that there must, of necessity, even in the most favorable mode of applying the crank to communicate rotary motion, be a great loss of power; and when the pistons are worked quickly there, must be a further great waste of power, by constantly acting against the impulsive force in bringing the piston and beam to rest.

But the loss of power is denied; as it is alleged that the work done by a given amount of steam, in reciprocating engines, equals, nay, that it even exceeds, its expansive force. The excess of work in the Cornish engines has indeed induced one civil engineer (Mr. Josiah Parkes) to suppose that steam possesses an additional power to that hitherto attributed to it; and to account for the quantity of work performed he assumes that the "*percussive force*" of steam contributes to the effect. We endeavored to prove, in a preceding number, the groundlessness of this opinion. We stated that steam of a given expansive force can exert no more than that amount of force, however applied; and that a "percussive" action can only be derived from a loss of expansive power. We believe, indeed, the fact will be found to be,—not that the duty performed by Cornish engines is greater than the expansive force of the steam employed, but—that the duty which any given amount of steam can perform has been under-valued.

Let us, then, in the next place, consider what is the largest possible amount of power that can be exerted by a given volume of steam.

To enable us to have more clear ideas of the actual force exerted by a given volume of steam, we will suppose it to be acting in a cylinder of one square inch area. Let the steam have an expansive force against the atmosphere of 15 lbs. Now, it is evident, that a weight of fifteen pounds attached to the piston working in the upright cylinder would exactly balance the force of the steam, and no action would ensue; but if the preponderance were diminished in the least degree, the weight would be lifted to the height of the cylinder, if the supply of steam were continued. If the cylinder or tube were thirty inches high, the quantity of steam used in raising the weight would be thirty cubic inches. The same results take place in larger cylinders when full pressure steam is employed; an additional cubical inch of steam is always required to raise a weight equivalent to balance the expansive force of the steam to a height of one inch. The extent of the cylinder, and the theory of general pressures, may tend to mystify the matter, but the effect must always be the same; for if a greater weight be lifted by a larger cylinder, the number of cubical inches of steam employed will be increased in proportion. If the weight increases, the height it is raised is diminished; if it be lessened, the height to which it may be raised is increased. This, therefore, is the maximum effect that can be produced by a cubic inch of steam when working as a solid piston of steam forced from the boiler, without taking into account its inherent expansive force. Its action, when working throughout at full pressure, is the same as that of water in an hydraulic press; every cubic inch acted on with a given force raises an equal weight one inch, and no more. But when the steam is allowed to act expansively as well as impulsively, its working effect may be greatly increased; and the higher the pressure, the greater is the increase.

Let us, for example, return to the one inch cylinder, and suppose a cubic inch of 15 lbs. steam be admitted under the piston weighted with rather less than 15 lbs. The weight would be raised one inch, and no more. When the communication with the boiler was cut off, the elasticity of the steam would give it force to resist that weight and to raise a less. By gradually diminishing the weight, the steam would expand to twice its bulk, and the average weight lifted for one inch during its expansion would be one-half that before raised, or $7\frac{1}{2}$ lbs. And this would be the

maximum of force that by any possible contrivance could be extracted out of one cubic inch of steam of fifteen pounds pressure, when acting against the atmosphere.

At higher pressures, or when acting against a vacuum, the maximum effect would be greatly increased. Suppose, for instance, that the pressure of the steam were four atmospheres, or sixty pounds, instead of fifteen, the maximum effort of a cubic inch of such steam would be, first, an impulsive effect equal to raise sixty pounds one inch; and an expansive, or elastic effect, for four more inches, equal to lift an average weight of thirty pounds to that height. In the latter case, therefore, it is seen, the elastic force inherent in a cubic inch of steam of that pressure is capable of doing twice as much work as its original impulsive power.

We perceive, from these considerations of the elastic force of steam, the great advantage gained by working steam expansively; and we see also the cause of the apparent small loss of power in the Cornish reciprocating engines. The loss of power which we conceive must always attend the use of the crank in communicating rotary motion may be in a great measure compensated by the extent to which the steam is worked expansively in those engines, but a greater amount of power could be gained from the same volume of steam, if the reciprocating action and the crank could be dispensed with.

The great advantage derivable from working high pressure steam expansively proves also that, unless rotary engines can combine the same principle of working the steam expansively, which we believe none have hitherto attempted to do, the advantages to be derived from a direct communication of rotary motion will be no saving of power.

RISE AND PROGRESS OF STEAM NAVIGATION AT GREENOCK.

(*From the Greenock Advertiser.*)

Nothing in the social condition of this country has undergone so rapid a change, in the way of improvement, as the means of travelling. This will be best estimated when we revert to the mode of travelling by water at a period not more distant from the present time than from 45 to 50 years. We have no doubt many of our readers will recollect the *fly-boats*, which were at one time employed for the conveyance of passengers on the Clyde. These boats, at the time of their establishment, were considered a vast improvement upon the small packet boats previously used. They were built, as far as we can learn, about the year 1792, and continued to ply till 1812 or 1813, when they were superseded by the steam-boats, with which, for a few months, they maintained a hopeless competition. We do not recollect to have seen any written description of the fly-boats. To supply a desideratum, now become more curious than useful, shall be briefly attempted. The alteration which was introduced by means of the fly boats being undoubtedly an improvement, we feel ourselves called upon, so far as our information will enable us, to record the names of those inventors or improvers, even in a humble way, who began with us the "go-a-head" system, leaving to the philosopher the duty of ascertaining whether or not the labors of the enterprising men we refer to may not have had some influence in suggesting the introduction of steam as a propelling power. The first fly-boats, and, we believe, all the boats of that description used on the Clyde, were built by our far-famed townsman, Mr. Thomas Nicol,* with the exception of one to be afterwards noticed. The first projectors and owners of the fly-boats were, John Fairlie, Malcom Campbell, and Andrew Rennie. The last-mentioned individual—a stirring speculative character—was the town drummer. The boats were built in the following succession:—The company above named built two boats; James M'Ara, one; two individuals of the names of Currie and M'Neillage, owned two; and last of all, of this class, James Brash and John M'Nab owned other two. But Mr. Rennie having conceived it practicable to improve upon this description of boat, proposed to his partners to build a boat to be propelled by wheels; they scouted the idea as altogether visionary, and Mr. Nicol having thrown out a hint that the scheme "would not do," Mr. Rennie, at his own expense, got Mr. John M'Kechnie, a boat-builder, to build him one somewhat broader than the former boats, to which he affixed two wheels, one on either side; these were wrought by manual power, and were intended to supersede the use of oars. This boat, which went by the appellation of "Rennie's wheel boat," made several trips to the Broomielaw, but was, after being used a short time, sold—it being found that tho labor of the oar was less toilsome than that of the wheel.

These fly boats were about 28 feet keel, from $7\frac{1}{2}$ to 4 feet beam, and about eight tons. They were wherry-rigged. A slight deck or awning was erected abaft the main-mast, so as to cover in the passengers, who sat in the after part of the boat upon longitudinal benches, similar to those in the canal boats. The fly-boats generally started from Greenock with a flowing tide, and, if the wind happened to be fair, they made no bad passage, all things considered; but if the wind and tide were adverse, no little labor was required, with sails and oars, to get them a-head, and sometimes, under these untoward circumstances, both passengers and crew were right glad when they got as far as Dunglass, to rest there till the next tide favored their advance. The cheapness of fare in these boats, which was one shilling and sixpence, strongly recommended them to the patronage of the public at a time when coach travelling was infinitely more expensive.

The unsuccessful experiment of Mr. Rennie's "wheel boat" did not deter another individual, destined to become more celebrated as a mechanist, from embarking in a similar scheme. This individual was Henry Bell. Mr. Bell employed Mr. Nicol to build for him a boat, about fifteen feet keel, with a "well" or opening "in the run," in which he placed a wheel, which was wrought by manual force as a propelling power. Mr. Bell, finding this wheel not to answer the purpose intended, got Mr. Nicol to plank up the "well in the run," and then he placed two wheels on the outside of the boat, one on either side, which were found to answer much better than the previous single wheel in the inside. This experiment was made some time before Mr. Bell fitted out the Comet with a steam-engine as a propelling power. What influence the one experiment may have had in suggesting the other we cannot say; but it is by no means improbable that a very intimate connection did subsist between them in Mr. Bell's mind, and that the second was a natural result of the progress of the first. Although Mr. Bell was undoubtedly the first person who applied steam-power in the open waters for actual business, we cannot forget Mr. Symington's steam-boat (which we have seen, after being laid up in the Forth and Clyde Canal, with her brick funnel), as far back as 1804, and which was employed, as Mr. Bell well knew, in towing vessels in the canal, on several occasions. But it is not our intention to enter into controversy.

Mr. Bell's indomitable spirit was not to be deterred from making another effort, and the building of the "Comet" was the result of his last experiment, which was crowned with entire success. The dimensions of the Comet were only 40 feet keel, 10 feet 6 inches beam, 25 tons burden, and one engine of three-horse power. We find the Comet advertised in this paper, under date 15th August, 1812.

The Comet beat the fly-boats out of the river, by the superiority of her speed, and *elegance* of her *accommodations*. We well remember her accommodations, having had a long passage in her more than once to and from Glasgow. Her cabin was scarcely an improvement upon those of the Highland packets, whose cabins, however, it very closely resembled, having a fir table in the centre, and benches or lockers for the passengers to sit on. What man would venture to have his sanity called in question by such a bold flight of imagination as to predict that the improvement which was begun in the Comet would terminate in such a floating palace as the Achilles; a vessel as unlike her prototype as the butterfly is like the chrysalis from which it emerges?

But we will not incur the risk we have just hinted at, by assuming that improvement has terminated even in such ornate vessels as the Archilles, Commodore, &c., when we look at our building yards, and view the powerful vessels in progress, for carrying the mail between Great Britain and the West Indies. Of this class there are five now building. One of these, building by Mr. Duncan, and which, from all appearance, will be launched in the course of this week, is of the following dimensions: 213 feet keel and fore-rake, 37 feet some odd inches beam, 225 feet over all, and will admeasure about 1,300 tons old measurement, or between 1,600 and 1,700 tons new measurement. We have not learned the power of her engines.

* Mr. Nicol has built 7,868 boats, extending in *lineal* measurement to upwards of *thirty* miles.

INVENTION FOR DESTROYING SHIPS.

(*From the Times.*)

An experiment was tried on Saturday afternoon, of one of the inventions to which we alluded last autumn, which a friend on whom we have reliance had an opportunity of witnessing. The trial took place in the grounds of Mr. Boyd, in the county of Essex, a few miles from town, in the presence of Sir Robert Peel, Sir George Murray, Sir Henry Hardinge, Sir Francis Burdett, Lord Ingestrie, Colonel Gurwood, Captain Britten, Captain Webster, and some other gentlemen, who all appeared very much astonished at what they saw. By the kindness of the inventor our informant occupied a position that enabled him to command a view of all that took place. A boat 23 feet long and 7 broad was placed in a large sheet of water; the boat had been the day before filled in with solid timber, four and a half feet in depth, crossed in every direction, and clamped together with eight inch spike nails. This filling in was made under the inspection of Captain Britten, who stated the fact to the distinguished gentlemen we have mentioned, and also that the inventor never went near the workmen employed, that no suspicion might be entertained of any combustible materials being lodged in the hold of the vessel. Several of the gentlemen were on Saturday rowed in a punt to the vessel, and examined it for themselves, so that every doubt might be removed as to the cause of destruction being external, and not from the springing of any mine. When the different parties had taken up their positions, on a signal from the inventor, the boat was set in motion, and struck just abaft her starboard bow, and instantaneously scattered into a thousand fragments. At the moment of collision the water parted, and presented to the eye of our informant the appearance of a huge bowl, while upon its troubled surface he noticed a coruscation precisely resembling forked lightning. A column of water was lifted up in the air like a huge fountain, from which were projected upwards for many hundred feet the shattered fragments of the vessel, which fell many of them several hundred yards distant in the adjacent fields. Our informant examined many pieces, and found the huge nails snapped like carrots; the mast looked like a tree riven by lightning, and

never before, as he assures us, has he witnessed so sudden and complete a destruction, though he had seen shell and rocket practice on the largest scale. Such seemed to be the unanimous opinion of all present. How this mighty effect was produced was of course not disclosed to so numerous a party, but two naval officers present were perfectly aware of the mode of operation, and the inventor offered to go into details confidentially with one or two of the distinguished officers present. In answer to a question from Sir Henry Hardinge, the inventor stated, that without a battering train, he could transport on a mule's back the means of destroying the strongest fortress in Europe. No doubt this is very startling, but, hearing what we have, we cannot pronounce it impossible; and as in every particular the inventor has done what he has undertaken to accomplish, it is only fair to give him credit for the performance of more than has yet been disclosed. The existence of these tremendous powers is placed beyond all doubt, and the inventor asserts them to be completely under his control, which, from what our informant has had an opportunity of observing, he believes to be really the case. The instrument that wrought so terrible an effect on Saturday, lifting into the air a boat weighing two and a half tons, and filled in with five and a half tons of solid timber, and displacing at least fourteen or fifteen tons of water, was only 18lb. weight. Our informant has handled it, and kicked it round a room when charged with its deadly contents, so portable and at the same time so safe is it —a point of vast importance, when we remember the daily accidents that are occurring from the detonating shells now used in our service. At Acre most of those employed burst before they reached their object, and they are liable to explode when rolling about a ship's deck, as was proved by the fatal accidents on board her Majesty's ship Medea, off Alexandria, and the Excellent, at Portsmouth, and are dangerous to carry in a common ammunition cart on a rough road.

FRENCH CUSTOMS DUTIES.

We have already given an outline of the propositions of the new French Customs Duties, which have been lately the subject of long debates in the French Chamber of Deputies. The following is a more full notice of several of the articles in the new tariff:—

"The article relating to the importation of foreign grains embraced two distinct questions—one, the question concerning oleaginous grains in general, the other that of linseed in particular. The customs law of 1836 had assimilated grains introduced by the frontier to those brought by sea—an enactment which, at the expense of navigation, gave a great impulse to frontier imports. Hence it was, that the Administration brought in the proposal that oleaginous grains coming by land should bear a distinctive duty. The seeds of flax, however, it was observed, required to be considered quite in a different light. The great improvements in woollen and cotton stuffs from the application of machinery seemed to render it desirable that linen also should be open to similar advantages. The interests concerned in the question of duties affecting linen were very numerous. To the growth of flax 160,000 hectares of land are devoted, while the western population gain a subsistence by hand-spinning. The founders of establishments, in imitation of English manufactures, the weavers employing threads of every kind, whether produced by the hand or by machinery, the vine-growers and silk manufacturers, who, if the duty on the seeds were raised, feared a retaliation on the part of the countries that furnish them,—all these were important interests which had to be consulted. As it was considered expedient to encourage French linen manufactures, it was remarked that any elevation of the duty on the flax-seeds should be balanced as far as possible by an increase in the duty on linen webs, as otherwise one interest would be sacrificed to another. Such a plan, however, would, it was considered, be attended with great inconveniences; for the threads are indispensable to the manufacturers, while the importation of foreign webs is but small; so that while the manufacturer paid a higher price for his thread, the difference in the importation would not be sufficient to cause a corresponding increase in the price of the web. The relations with Belgium had also to be considered with regard to this question. The reduction of the duty on webs in 1836 was followed by a reduction in Belgium on several articles of French produce, and hence it might be inferred that a contrary movement on the side of France would be followed by retaliation on the side of Belgium, and the consequent loss of a commercial ally.

"With respect to the complaints made by the French agriculturists against the progressive importation of linseed, the question was at last considered, whether in fact these complaints were well-founded—whether, indeed, the foreign grains had really been substituted for those of French produce; and this question, it is said, has not yet been answered; while it is not to be forgotten that the oil manufactures of the south of France have been greatly benefited by the importations of foreign grains. It will be remembered that the proposed augmentation of the duty on flax was rejected.

"Another important subject that was brought forward was the importation of foreign cattle. Here it was observed in the journals, that in 1823 more than 41,000,000 kilogrammes of meat were consumed in Paris, and that by a population of 714,000, while in 1836 it was but 43,000,000 kilogrammes for 909,000; so that in the former case the consumption was 58, and in the latter 48 kilogrammes for the individual, the price rising according to the diminution of the quantity. The proposed amendment of the duty on foreign cattle was less to diminish than to rectify the impost, merely substituting a duty levied by weight for one levied per head. The amendment was, however, withdrawn, so that small and large cattle necessarily pay the same duty. Some curious statistics have been brought forward with reference to this article, by which it appears that if 50 kilogrammes is the extreme allowance for the inhabitants of towns, it is only 24 for those of towns and country places taken together, which is much less than the rations allowed to soldiers and prisoners; that for the former being 90, and that for the latter 70 kilogrammes per year."

BRITISH PATENTS.

MONTHLY LIST OF NEW PATENTS.

Charles Schafhautl, of Swansea, M. D., Edward Oliver Manby, of Parliament-street, civil engineer, and John Manby, of the same place, civil engineer, for *improvements in the construction of puddling, balling, and other sorts of reverberatory furnaces, for the purpose of enabling anthracite or stone coal, &c., to be used therein as fuel.*—6 months, Jan. 30.

James Mac Lellan, of the city of Glasgow, manufacturer, for *an improved combination of materials for umbrella and parasol cloth.*—6 months, Jan. 30.

Ezra Jenks Coates, of Broad-street, Cheapside, machinist, for *improvements in the forging of bolts, spikes, and nails.*—6 months, being a communication, Jan. 30.

Henry Pape, of Great Portland-street, pianoforte manufacturer, for *improvements in castors.*—6 months, Feb. 1.

Charles Hood, of Earl-street, Blackfriars, iron merchant, for *improvements in giving signals.*—6 months, Feb. 1.

William Wilkinson Tailor, of Barrowfield House, Westham, Essex, gent., for *improvements in buffing apparatus for railway purposes.*—6 months, Feb. 1.

Dominic Frick Albert, of Cadeshead, Manchester, LL.D., for *an improved or new combination of materials and processes in the manufacture of fuel.*—6 months, Feb. 1.

Francis Sleddon, jun., of Preston, machine-maker, for *certain improvements in machinery or apparatus for roving, slubbing, and spinning cotton, and other fibrous substances.*—6 months, Feb. 2.

William Ward Andrews, of Wolverhampton, ironmonger, for *certain improved methods of raising and lowering windows and window blinds, and opening and shutting doors, which are also applicable to the raising and lowering of maps, curtains, and other articles.*—6 months, Feb. 2.

Thomas Young, of Queen-street, London, merchant, for *improvements in furnaces or fire-places for the better consuming of fuel.*—6 months, Feb. 3.

William Hancock, jun., of King-square, Middlesex, accountant, for *an improved description of fabric, suitable for making friction gloves, horse brushes, and other articles requiring rough surfaces.*—6 months, Feb. 3.

Joseph Bunnett, of Deptford, engineer, for *certain improvements in locomotive engines and carriages.*—6 months, Feb. 3.

John Cartwright, of Loughborough, manufacturer, Harry Warner, of the same place, manufacturer, and Joseph Haywood, of the same place, frame-smith, for *improvements upon machinery commonly called stocking-frames or frame-work knitting machinery.*—6 months, Feb. 4.

Thomas Griffiths, of Birmingham, tin-plate-worker, for *certain improvements in such dish covers as are made with iron covered with tin.*—6 months, Feb. 8.

Thomas Thorburn, of Manchester, machinist, for *certain improvements in machinery for producing knitted fabrics.*—6 months, Feb. 8.

William Ryder, of Bolton, roller and spindle maker, for *certain improved apparatus for forging, drawing, moulding, or forming spindles, rollers, bolts, and various other like articles, in metal.*—6 months, Feb. 8.

Thomas Fuller, of Salford, machine-maker, for *certain improvements in machinery or apparatus for combing or preparing wool, or other fibrous substances.*—6 months, being partly a communication, Feb. 8.

Elisha Holdham, of Cricklade, Wilts, railroad contractor, for *certain improvements in the construction of turning-tables to be used on railways.*—6 months, Feb. 8.

Charles Green, of Birmingham, gold plater, for *improvements in the manufacture of brass and copper tubes.*—6 months, Feb. 8.

William Wigston, of Salford, engineer, for *a new apparatus for the purpose of conveying signals or telegraphic communications.*—6 months, Feb. 8.

John Stott, of Great Bowden, Market Harborough, timber merchant, for *improvements in constructing railways, and in propelling carriages thereon, which improvements are applicable to raising and lowering weights.*—6 months, Feb. 8.

James Johnston, of Willow Park, Greenwich, esq., for *improvements in obtaining motive power.*—6 months, Feb. 8.

William Henry Fox Talbot, of Locock Abbey, Wilts, esq., for *improvements in obtaining pictures or representatives of objects.*—6 months, Feb. 8.

William Edward Newton, of Chancery-lane, Middlesex, mechanical draftsman, for *improvements in obtaining a concentrated extract of hops.*—6 months, being a communication, Feb. 15.

Theophilus Smith, of Attleborough, Norfolk, farmer, for *certain improvements in ploughs.*—6 months, Feb. 15.

James Whitelaw and George Whitelaw, engineers, of Glasgow, for *a new mode of propelling vessels through the water, with certain improvements on the steam-engine, when used in connection therewith,*

part of which improvements are applicable to other purposes.—6 months, Feb. 15.

PHILIP WILLIAM PHILLIPS, of Clarence-place, Bristol, gent., and WILLIAM BISHOP PECK, of Broad-street, Bristol, wine merchant, for *improvements in four-wheeled carriages.*—6 months, Feb. 15.

JAMES RANSOME and CHARLES MAY, of Ipswich, machine-makers, for *improvements in the manufacture of railway chairs, railway or other pins or bolts, and in wood fastenings and trenails.*—6 months, Feb. 15.

WILLIAM SCAMP, of Charlton-terrace, Woolwich, surveyor, for *an application of machinery to steam-vessels, for the removal of sand, mud, soil, and other matters, from the sea, rivers, docks, harbours, and other bodies of water.*—6 months, Feb. 16.

WILLIAM SAMUEL HENSON, of Allen-street, Lambeth, engineer, for *certain improvements in steam-engines.*—6 months, Feb. 16.

GEORGE EDWARD NOONE, of Hampstead, engineer, for *improvements in dry gas-meters.*—6 months, Feb. 18.

WILLIAM ORME, of Stourbridge, iron-master, for *improvements in the manufacture of cofered spades, and other cofered tools.*—6 months, Feb. 18.

JOHN COLLARD DRAKE, of Elm-tree road, St. John's-wood, land surveyor, for *improvements in scales used in drawing and laying down plans.*—6 months, Feb. 18.

ANTHONY BERNHARD VON RATHEN, of Kingston-upon-Hull, engineer, for *certain improvements in fire-grates, and in parts connected therewith, for furnaces for heating fluids.*—4 months, Feb. 22.

WILLIAM NEWTON, of Chancery-lane, Middlesex, civil engineer, for *improvements in the process of, and apparatus for, purifying and disinfecting greasy and oily substances, or matters, both animal and vegetable.*—6 months, being a communication, Feb. 22.

THOMAS WILLIAM BOOKER, of Meliu Griffiths Works, near Cardiff, iron-master, for *improvements in the manufacture of iron.*—6 months, Feb. 22.

JONATHAN GUY DASHWOOD, of Ryde, Isle of Wight, plumber, for *improvements in pumps.*—6 months, Feb. 22.

MOSES POOLE, of Lincoln's-inn, Middlesex, gent., for *improvements in tanning, dressing, or currying skins.*—6 months, being a communication, Feb. 22.

JOHN DEANE, of Dover, chemist, for *improvements in preparing skins, and other animal substances, for obtaining gelatine, size, and glue, and in preparing skins for tanning.*—6 months, Feb. 23.

CHARLES SNEATH, of Nottingham, lace-manufacturer, for *certain improvements in machinery, for the making or manufacturing of stockings or other kinds of loop work.*—6 months, Feb. 23.

PATENT NOT SPECIFIED LAST WEEK WHEN DUE.

JOHN YOUNG, of Wolverhampton, Stafford, iron master, for *improvements in the manufacture or construction of knobs, handles, frames, tablets, boxes, and other ornamental articles, applicable to the decoration of houses and domestic furniture,* due Feb. 17.

ENGLISH EXPIRED PATENTS.

PHILIP JACOB HEISCH, of America-square, London, merchant, for *improved machinery for spinning cotton* (communicated by a foreigner), Feb. 20.

CHARLES BARWELL COLES, Esq., late of Duke-street, Manchester-square, and WILLIAM NICHOLSON, of Manchester, civil engineer, *a new method of constructing gasometers, or machines or apparatus for holding and distributing gas for the purposes of illumination* (communicated by a foreigner), Feb. 20.

WILLIAM BENECKE, of Deptford, gent., *a machine for grinding or crushing seeds and other oleaginous substances for the purpose of extracting oil therefrom* (communicated by a foreigner), Feb. 20.

WILLIAM JEFFERIES, of London-street, Radcliffe, brass manufacturer, *improvements in calcining or roasting, and smelting or extracting metals and semi-metals from various kinds of ores, and matter containing metals or semi-metals,* Feb. 20.

PIERRE ERARD, of Marlborough-street, musical instrument maker, *improvements in the construction of pianofortes* (communicated by a foreigner), Feb. 20.

AUGUSTUS DE LA GARDE, of St. James's-square, *a method of making paper of various descriptions, from the bullen or ligneous parts produced from certain textile plants, in the process of preparing the same textile plants by the rural mechanical brake (for the exclusive use of which he has already applied for a patent), and which substances are to be employed alone, or mixed with other suitable materials, in the manufacture of paper* (communicated by a foreigner), Feb. 20.

WILLIAM SMITH, of Sheffield, merchant, *an improved method of manufacturing cutlery and other articles of hardware, with, or by means of, rollers,* Feb. 20.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 117.)

PIERRE ARMAND LE COMTE DE FONTAINEMOREAU, of Sise-lane, London, for *certain improvements in covering and coating metals and alloys of metals* (communicated by a foreigner), Feb. 15.—The first of these improvements is the coating and covering of metals with gold.—Claim first.—The use of all the substances named in the first process for covering and coating with gold, as well as all the salts of their bases, either alone, combined, or mixed with other substances; the substances claimed being the barytes, strontites, lithia, lime, magnesia, zinc, and their salts.

The articles are first heated to a red heat, then cooled a little, and thrown into water slightly acidulated with sulphuric acid; they remain in that bath until they are perfectly cleaned, when they are taken out and dried in sawdust; they are then thrown into another bath to give them a fine color, which bath is composed of one part, by weight, of sulphuric acid, one part water, and two parts azotic acid. When the articles are turning black they are taken out, and immediately thrown into some *azotic* acid of from 30 deg. to 36 deg. of Beaume's areometer, this turns them to a fine yellow color, and as soon as they have attained that color they are taken out, and well washed in clean water, and dried; after which they are brushed with a metallic wire brush, and burnished on the parts which require it.

The articles of silver are heated to a red heat, and thrown into an acidulated bath, in which they remain three or four hours; as soon as they become white they are taken out, rubbed with water and fine sand, and then washed with clean water, and dried.

The solution of gold is composed of one part, by weight, of gold, dissolved in some bromine or some chlorine, or azoto-chloridric acid, or azoto-iodydric acid. This solution is made to evaporate till it becomes like syrup; and to prevent the salt of gold volatilising, the evaporation is to be carried on in a glass retort. The process is finished by either of the following baths, but the patentee prefers the first:—

First bath,—400 parts, by weight, of distilled water, are put into an iron pot well enamelled, placed on a fire, and, when tepid, 70 parts of hydrated barytes, or 70 parts of hydrated strontites, are added to them; when the whole is dissolved, it is scummed, if necessary, and the gold solution is added. The whole is made to boil slowly till the bath begins to turn to a dark purple color, and then the articles to be coated are immersed in it. When taken out, they are washed in water, acidulated with sulphuric acid or vinegar, and again washed in clean water; after that they are dried in sawdust, brushed with a metallic wire brush, and burnished on the parts which require it. Articles of silver must be covered with a copper wire, or they will not gild.

Second bath,—A similar solution of gold is use with common water instead of distilled water, and 45 parts, by weight, of lithine. The operation proceeds as before.

Third bath,—Three parts, by weight, of gold, are dissolved as before, and to them are added 1,000 parts of water, 125 parts of quick lime in fine powder, or 75 parts of magnesia; also 25 parts of chloride of calcium, or of chloride of magnesia; the whole is boiled up together, and the articles immersed in it.

Fourth bath,—To the solution of gold prepared as before, but composed of 8 parts, by weight, of gold, is added from 50 to 80 parts of oxide of zinc in fine powder, and 100 parts of water; the whole is stirred up, and when the decomposition takes place, 400 parts of water and 350 parts of chloride of zinc are added, and after it has boiled the articles are immersed in it as before.

Fifth bath,—Five parts of dissolved gold are precipitated by means of oxide of zinc, and after they are filtered and washed the precipitated part is put into 300 parts of distilled water, and to these are added 250 parts of chloride of barium, barytes, or of strontium, strontites, or of zinc, or of lime, or of magnesia; the whole is boiled, and the operation performed as before.

The second of these improvements is the covering and coating metals with silver.

Claim second.—The use of the chlorides of barium, barytes of sodium, of strontium, strontites of lime, of magnesia, and of zinc, either alone, combined, or mixed with other substances, in the second process for covering and coating with a coat of silver; and the herein described way of operating, with the second process.

The solution of silver is composed of the following:—10 parts, by weight, of pure silver, are dissolved in azotic acid, and evaporated until the matter becomes entirely dry, and then dissolved in distilled water. Instead of using the nitrate of silver, which is what has just been obtained, any other salt of silver can be used.

In an iron pot, well enamelled, are put 5,000 parts, by weight, of water, 900 parts of chlorine of barium, barytes of sodium, or of strontium, strontites of lime, or of magnesia, or of zinc, and from 1,000 to 1,400 parts of cream of tartar, well powdered. When the whole boils, the silver solution is added, with 25 parts of boracic acid, and when the bath begins to concentrate, and the salts to decompose a little, the articles are plunged into it. They are, after being taken out, perfectly washed in tepid water, and brushed with a metallic wire brush; then dried and burnished.

The third of these improvements is the covering and coating of metals with platinum.

Claim third.—The use of double chlorines of platinum, and of barium, barytes, and of strontium, strontites of magnesia, of lime, of ammonia, and of zinc, either alone, combined, or mixed with other substances, in the third process for covering and coating with a coat of platinum; also the oxides and the salts of their bases, either alone, combined, or mixed with a salt or an oxide of platinum.

The solution of platinum is composed of two parts, by weight, of platinum, dissolved in the acid, azotic, chlorhydric, or in the bromine; and when evaporated till it becomes nearly dry, 40 parts of distilled water, and 15 parts of chloride of barium, or of strontium, or strontites of lime, or of magnesia, or of zinc, or of chloride of ammonia, are added to it, and the whole is made to boil. The articles plunged into this composition take a grey coating, and on being taken out are brushed with the metallic wire brush, and dried.

LUKE HERBERT, of Birmingham, Warwick, civil engineer, for *certain improvements in the manufacture of needles,* Feb. 17.—This invention consists in a mode of perfecting and polishing the eyes of needles by drawing wires through them.

Claim first.—The construction and employment of the machinery herein described, for perfecting the form and polishing the eyes of needles, by drawing wires through them, whilst fixed in straight or curved lines.

Claim second.—The use of wires for the above purposes, to which has been given either a helical or undulating figure.

Claim third.—The use of the compositions herein described, or any other suitable cutting or polishing material or mixture, whether in a fluid, semi-fluid, or dry state, in conjunction with wires, whether straight, helical, or undulating.

A hank of wire is cut into pieces of 30 inches in length, one half of each of these pieces being left straight, and the other half formed into a helical coil, by winding it round a steel pin or mandril. About four hundred needles are threaded on the plain part of the wire, and placed between the jaws of a clamp, which resembles a large hinge joint, the inside of its jaws being formed of hard wood, with the upper parts padded with leather. Six or seven of these clamps, holding the same number of needles, are then placed parallel to each other in a frame, and the ends of the wires are attached to an outer frame, which, being moved by a wheel and crank, causes the wires to move backwards and forwards in the eyes of the needles, which rise, as it were, out of a groove in the clamp; this groove is kept filled with one or other of the hereafter mentioned compositions, in order that the wire may work with greater ease through the eyes of the needles.

In two or three minutes the operation is finished, and the eyes of the needles are cleansed by washing them in a weak solution of soap, and afterwards in fair water, which being done, they may be dried either in a warm bath, or by shaking them up with warm dry saw dust.

One of the before-mentioned compositions is a mixture of oxide of tin and olive oil, in such proportions as to be of the consistence of cream, at an ordinary temperature (about 60 degrees Fahrenheit).

Another composition is composed of olive oil and colcothar, or crocus martis, in the same proportions as the materials in the other compositions. These powders should be finely levigated and washed, in order to produce a high polish; and soft soap, diluted either with water or oil, may be substituted for oil in the above compositions.

The patentee likewise passes the wire through the eyes of the needles when placed in a curved form, with their heads abutting against semi-circular rims of metal, by attaching the ends of the wires to the ends of a beam, which is moved backwards and forwards by any suitable mechanism.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 1st of May.

Charles Parker, of Darlington, Durham, flax-spinner, due April 22.

Richard Edmunds, of Banbury, Oxford, gent., due April 22.

Thomas Clark, of Wolverhamton, iron-founder, due April 22.

PATENT LAW CASE.

Amendment in the Title of a Patent.—In the Rolls Court on Wednesday, the petition of Christopher Nickells, to amend the proceedings for obtaining a patent for "an improvement in machinery for re-covering fibres applicable in the manufacture of braids and other fabrics," was resumed; and Mr. Kindersley, for the London Caoutchouc Company, against, and Mr. Tinney, for Nickells, the petitioner, were heard, The petition was to strike out the letters "re," so as to alter "re-covering" into "covering." Lord Langdale said, the petitioner adopted the usual proceedings to obtain a patent, in the course of which a clerical error was made by a clerk in one of the offices, which was not discovered at the time. The error was in the enrolment which was in his (the Master of the Rolls') custody. After litigation had commenced between the petitioner and the parties opposing him, the petitioner applied to have the error in the Privy Seal bill and the letters patent corrected. Considering it clear that it was a slip, it was his (Lord Langdale's) duty to assist all he could towards the amendment in the way least prejudicial to the other party; but whether he could legally make the amendment was a matter of serious consideration, as well as the manner of making it. He could not enter into the moral consideration; the object was to take advantage of the slip; the party had a right to do so if the law allowed it. It was said that if all before the enrolment were not rightly done, there was nothing to amend by, and much learning and ingenuity was applied in behalf of this proposition. Should it prevail it would be a great triumph of subtlety over common justice. There was another objection —that the letters patent and record ought to correspond, and the application was to make the record, by obliterating the letters *re,* correspond with the letters patent. He was strongly impressed that what was asked could not be legally and effectually done without the concurrence of the Lord Chancellor. Their joint concurrence was requisite. He did not think it was necessary for them to see that the anterior steps had been duly made, for he had the Queen's sign manual bill and the consent of the Attorney-General to the proposed alteration. Those steps were not taken for the security of the Crown, and to prevent improvident grants, but for the purpose of securing a revenue, which revenue had been satisfied by what had been done. He would make no order until he had communicated with the Lord Chancellor. There appeared to him very considerable doubt.

[This affords another instance of the manner in which justice and common sense are continually made to give place to legal subtleties. There would be no difficulty in the matter if the merits of the case were considered.]

FOREIGN INTELLIGENCE.

FRANCE.

ACADEMY OF SCIENCES.

At the sitting of the French Academy on the 15th inst., the following subjects were brought under notice:—

M. Boussingault read a paper on the air contained in snow. This air has generally been considered of a different quality from atmospheric air. It was thought to contain more oxygen. The analyses of M. Boussingault lead to a different conclusion, by proving that the proportion of oxygen is the same in the air of snow as in the air of the atmosphere; the variations in the analyses are not greater than the variations which exist with respect to the air we breathe. M. Dumas observes that these difficulties will soon be removed by some researches on the subject, the joint production of himself and M. Boussingault. The analyses have hitherto only given the proportion of oxygen combined with azote in the air to a fortieth part, and they hope to give it to the thousandth part. Their plan consists in estimating the gas by weight, and not by volume, as has always been done. When their method is known, the exact composition of air taken on a certain day will be ascertained, and it will afterwards be possible to ascertain whether any important change has taken place in this respect capable of modifying the actual condition of organisation on the surface of the globe.

M. Arago presented an instrument calculated to decide the question, what was the position of the magnetic needle in the middle of the sixteenth century? It is known that before the foundation of the Academy of Sciences the needle tended towards the east. It began to point towards the west in the year 1666, and since 1816 it has again returned towards the east; but it is not known towards what point it turned at an intermediate time. An astrolabe is in the possession of M. Hubert, which bears the date 1741, and the artist has pointed out on this instrument, which is very well made in other respects, the position of the needle at 7 deg. and one third.

M. Arago communicated to the Academy further particulars relative to Dr. Boucherie's method of impregnating wood. Instead of operating on the tree at its roots, or even at the time when it is felled, M. Boucherie succeeds in introducing his preservative substance, the pyrolignite of iron, at the upper part of the trunk, by placing the liquid in a sort of funnel which has the tree for its spout; by this means a thorough filtering takes place through the fibres of the wood, and in a short time the solution of pyrolignite becomes substituted for the sap, which escapes at the lower extremity.

It is not, as M. Biot observes, always the pure sap which is obtained in this manner, as M. Boucherie supposes, but the sap mixed with all the substances that have been dissolved by the filtering fluid. This experiment, indeed, was first made by M. Biot, who made a report of it to the Academy many years ago, presenting, at the same time, a small apparatus of his own invention intended to collect the sap of trees in their highest state of purity. M. Boucherie is convinced, said M. Arago, that wood impregnated with pyrolignite of iron is more capable of resisting cannon balls than common wood is; whence, according to the learned secretary, it may be inferred that it would be possible to make cuirasses of prepared wood lighter and more commodious than cuirasses of metal. It is proved by the experiments of M. Boucherie, that the liquid absorbed by the trees does not penetrate the fruits, unless the latter are at the same time subjected to the action of a drying substance. This, said M. Arago, will constitute a new method of keeping fruits without the necessity of going through the culinary process of preserving.

It appears from the experience of eleven years at the hospital of St. Louis, in Paris, that the plan of converting bones into nutritious food has been most successful. It seems that within eleven years there has been produced from bones in that hospital 1,643,950 litres of gelatinous solution, and 7,240 kilogrammes of fat. With these products from the bones 3,456,307 rations were provided, with which 94,542 persons have been fed during the eleven years. It appears from these practical experiments on a large scale, that one hundred weight of dry bones yielded about a proportion of thirty-six of dry nutritive substance. The experiments were conducted with care, so as to ascertain the expense as well as the products. The total cost of the produce was 19,354 frs. for the 1,643,950 litres; or upwards of 177 rations for a single franc.

The Customs officers of France have published a statement of the principal goods imported during the year 1840, with an account of the quantities which remained in the warehouses at the end of the month of December. From this table the following are some results:—Sugars imported from French colonies in 1839, 87,500,000 kilogrammes; in 1840, 75,600,000 kilogrammes; whilst the foreign sugar imported was, in the former year, 6,500,000; and in the latter, 17,000,000 kilogrammes. The quantity remaining in December was 13,400,000 kilogrammes. Of cotton, the importation in 1839 was 51,000,000 kilogrammes, and the consumption 40,000,000; in 1840, the importation was 85,000,000, and the consumption 52,000,000; the quantity in store in December, 20,000,000. It appears, therefore, that France exports a large quantity of the raw cotton she receives. The woollens imported in 1839 and 1840 are stated to have been the same, viz., 13,000,000 kilogrammes in each year. The coal imported in the two last years was also nearly equal, being about 1,200,000,000 kilogrammes in each. Of cast-iron, the quantity imported in 1839 was 17,000,000 kilogrammes; and in 1840, 19,000,000. The quantity of linen and hempen threads imported in the former year was 6,959,000 kilogrammes, and in 1840, nearly the same, viz., 6,869,000 kilogrammes.

BELGIUM.

A great deal of difficulty has arisen relative to the disposal of the immense establishments of the late Mr. John Cockerill, at Seraign, for the benefit of his creditors. The whole property has been advertised for sale in March next, but it is so extensive that no individual purchaser can be found for the whole. In case no purchasers should come forwards disposed to give a reasonable price for the property, it is proposed to divide the value of the establishment into shares, to be distributed among the creditors in proportion to their demands. The establishment, according to this arrangement, would be kept in work, and the shares would be saleable in the market according to the estimation of their value.

BELGIAN COMMERCE.

The Belgian Government has consulted the Chamber of Commerce in that country on the fitness and utility of creating in Belgium a commercial company similar to that already established in Holland. They are to give their opinion as to whether such a company might not be of great service to Belgian manufacturers in endeavoring to procure outlets for their produce in foreign markets. Other questions subsidiary to this have also been submitted to their deliberations.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

London and South-Western Railway.—On Saturday last, the 13th half-yearly meeting of this company was held at the terminus at Nine Elms, Vauxhall, and was very fully attended. The following is the report read by the secretary.

"REPORT.

"The statement which is this day placed in the hands of the proprietors shows that the total amount received for traffic during the half-year ending the 31st of December last, was £144,166 2s., and that of this sum £16,124 19s. 6d. was received for the conveyance of goods and live stock, while £128,041 2s. 6d. was derived from carrying passengers, parcels, and those smaller items, generally included under the head of passenger traffic. That during the first half-year of the opening of the entire line from London to Southampton, the receipts from this most important branch of traffic should at once so nearly approximate to that sum which it was stated would be receivable when, owing to the appreciation of the increased facilities afforded by the railway, the existing traffic on this line of road should become doubled, is a matter for solid congratulation.

"The amount received for carrying goods is comparatively small, but this will doubtless be increased when the facilities for mercantile transactions at Southampton, which are now in progress, shall be completed. Already some of the establishments connected with steam navigation have felt the importance of Southampton in a sufficient degree to make it their point of arrival and departure, and these will doubtless be followed by others.

"The directors have in a former report noticed the advantage of Southampton as a passenger steam-packet port for all the south-western coast of England, and subsequent information leads them to place great reliance on that circumstance as a means of increased revenue.

"On referring to the traffic accounts for the two preceding half-years, it will be found that, excluding the duty paid to government, local rates and taxes, and the interest on borrowed money, the expenses on the half-year, from June to December 1839, were 47½ per cent. on the receipts; in the following half year the expenses were 44 per cent. on the receipts, while in the last half-year up to the 31st of December last the expenses were reduced to 40¾ per cent.; and the directors believe that when further experience and practice in the various departments are obtained, the cost of management and working may be still further reduced. As one security for a further reduction of current expenditure, the directors have the pleasure to announce that they have contracted for the future maintenance of the way for a term of years. Mr. Brassy, whose spirited exertions the directors have had previous occasion to notice, has entered into a contract for this purpose, and the directors feel themselves justified therefore in relying upon the utmost efficiency and economy in this large branch of current expenditure. The bringing so important an item within a definite limit cannot fail to be satisfactory to the proprietors. In the other branches of expenditure, the aim of the directors will be the same, viz., to reduce them as far as is consistent with the efficient working of the line, and the comfort and safety of the public.

"The accounts show that a net profit of £62,095 19s. 7d. has been made by the traffic of the last half-year, after the payment of the interest on the debenture bond debt of the company, and all other current outgoings, which, added to a former balance of £30 16s, 2d. and £296 11s. 9d. received for pier dues, makes £62,422 7s. 6d.; out of this sum the directors propose to pay a dividend of £1 10s. per share. This will leave a reserve fund of £8,422 7s. 6d. available for future dividends or depreciation of stock.

"The directors, on the present occasion, have to submit for the approbation of the proprietors the plan by which they propose to raise the additional capital which may be necessary for completing and furnishing the whole line, both to Southampton and to Gosport. It is proposed to issue 42,000 scrip shares of £5 each, to be called tenths; this will make as many tenths as there are at present shares in the company, and it is intended to give to every shareholder the option of taking, at par, one of those tenths for every share of which he was on the 13th instant the registered proprietor; and it is further intended, after the passing of the act now sought to be obtained, to convert these tenths into £50 shares.

"Since the last meeting of the proprietors Mr. Easthope, the late chairman of the court of directors, has resigned the chair, and Mr. Robert Garnett, the deputy-chairman, has been unanimously elected thereto; and Mr. Chaplin has succeeded Mr. Garnett as deputy-chairman."

The Secretary read a letter from the secretary of the Royal Mail Steam-packet Company for the conveyance of the West Indian and South American mails, stating that that company had selected the port of Southampton as the station for their vessels.

The Chairman said, that, in addition to that very gratifying intelligence, he had to announce that several other companies had already established themselves at Southampton; the Commercial Steam Navigation Company, the Peninsular and Oriental Steam Navigation Company, the South of England Steam-packet Company; and the West India and the Dublin steamers were already advertised to call at Southampton. These facts, he thought, were sufficient to show that the directors, in their administration of the affairs of the company, had rightly judged of the importance of Southampton in reference to steam navigation.

The Chairman subsequently stated in reply to a question from a proprietor, the terms of the contract into which the company had entered with Mr. Brassy. The distance from London to Southampton by the railway was 77 miles; they had entered into a contract for ten years with Mr. Brassy for the repairs, at £24,000 a year, or about £311 a mile. For that £311 a mile, Mr. Brassy undertook to maintain to the satisfaction of Mr. Locke, their chief engineer, all the embankments, cuttings, tunnels, bridges, culverts, rail sidings, slopings, and, in fact, the whole of the repairs in the most efficient manner. There were only two things in the matter of maintenance for which the company were responsible; the first was, that, as the sleepers decayed, the company were to find new sleepers, Mr. Brassy finding the labor for their being laid; and the other might arise from an increase of traffic, when it might be necessary to have additional sidings; in that case the company were to find the rails, Mr. Brassy undertaking to do the repairs for an amount to be settled between him and the engineer. The connection which had already subsisted between Mr. Brassy and the company had been most satisfactory; he had executed many works, and had faithfully and honestly performed his duty to the company and to the public, and there would be no difficulty in bringing Mr. Brassy to do what was right, fair, and honest. Reverting to the expense, it appeared that, during the last half-year, the cost of maintaining 59 miles—for Mr. Brassy had the 18 miles between Winchester and Southampton—would be found to be £13,764. If this were paid in the same proportion for the whole 77 miles, the sum for the half-year would reach £18,000, and the whole expense for the year would be £36,000, instead of £24,000, for which they had contracted with Mr. Brassy.

The report was then agreed to. A dividend of £1 10s. per share for the last half-year was declared, being at the rate of about six per cent. per annum. It was stated that the branch line to Gosport would be opened next July. A resolution empowering the directors to issue certain new shares was carried *nem. con.* A vote of thanks having been passed to Mr. Easthope, the late chairman, for his services to the company, that gentleman returned thanks. He did not enter into any explanation of the circumstances of his resignation, as had been expected. The meeting then adjourned.

Birmingham and Gloucester Railway.—The half-yearly general meeting of the proprietors of this company was held at the Bell Hotel, Gloucester, on Tuesday last, Captain C. R. Moorsom, R.N., who has recently accepted the office of chairman of the board of directors, presided. The Secretary then proceeded to read the report of the directors, of which the following is an extract:—"The railway was opened in June last between Bromsgrove and Cheltenham, a distance of thirty-one miles; a further distance of five miles to Cofton, was opened in September; the part between Cheltenham and Gloucester, in November, and the entire line, to Camp Hill, Birmingham, on the 17th December last. The works on the extension running into the London and Birmingham Railway are in a very forward state, and the junction is expected to be effected in three or four months. The season of the year at which the complete opening took place has operated much against the passenger traffic. The experience of all other railway companies has shown that it requires time to develop the resources of these undertakings, and the directors see no reason to alter the views they have hitherto conveyed in the revised estimates, as to the probable passenger traffic on this line. The arrangements of the company have not yet allowed of their conveying goods, except to a very limited extent; but applications have been received from the principal carriers, and they are prepared to commence using the railway whenever the company can accommodate them. The arrangements for this purpose are near completion, and the directors believe that in this branch of business the receipts will be large. The Postmaster General having required two night trains each way, for the conveyance of the mails, they commenced running on the 6th inst.; but owing to the unseasonableness of the hours, the number of passengers conveyed by these trains has been very small. The proprietors will participate in the satisfaction felt by the directors, that more than 120,000 individuals have been conveyed along the railway since it was opened, without the slightest accident to a single passenger. In the last report the directors stated that they had taken possession of the line between Cheltenham and Gloucester, under the arrangements subsisting between this company and the Cheltenham and Great Western Union Railway Company, as settled by their respective acts of parliament; and that notwithstanding the extra expenditure caused by this circumstance, their calculations then led them to expect that the sum which they were authorised to raise by the act incorporating the company, would be sufficient to provide the necessary funds for that purpose, as well as to complete the original works of this company. They regret that these expectations will not be realised. The sum thus appropriated to the line between Cheltenham and Gloucester, makes a deficiency in the funds which were intended to be applied to the completion of the stations, together with the locomotive and carriage stock. Should the Cheltenham and Great Western Union Railway Company redeem, in the year 1845, their interest in the line between Cheltenham and Gloucester, a large sum will be repaid to this company; but to meet the deficiency above-mentioned, the directors recommend that this meeting should authorise them to borrow £60,000 upon the loan notes of the company, or in such other way as may appear to them most expedient. When Captain Moorsom was invited to join the direction, he deemed it right, before he accepted the invitation, to communicate to the board his views on railway management, suggesting that if the number of directors was reduced to three, or five, each taking a particular department, and making himself responsible for the discharge of its duties, the system would be much improved both in energy and economy. In these views the board concurred, and in consequence four of the directors have undertaken

the care of different departments, with Captain Moorsom's assistance; they will act as a committee, with the full power of the board itself. This arrangement must be considered an experiment: should it prove successful, as the directors confidently believe it will, the proprietors may consider it expedient at some future time to make a permanent reduction in the number of the board. Referring to the paragraph on the subject as to Sunday travelling, in the last report, the directors have to suggest to the proprietors that a special general meeting be held at Birmingham, on a convenient day, for the purpose of deciding whether any or what trains should run on Sundays, over and above the four now carrying the mails under the orders of the Postmaster-general." A long discussion occurred, in the course of which, the chairman explained the causes which induced him to recommend the important change in the management which had placed him in so responsible a situation. It appeared from the statement of accounts, that the receipts in the last half year amounted to £21,768, and the expense of working, &c., to £22,380. An amendment was proposed to refer the accounts to the inspection of a committee of auditors, but it was rejected by a majority of 28, over 16. The meeting then adjourned, after thanks had been voted to Captain Moorsom.

The Great Western Railway.—On Thursday the half-yearly general meeting of the proprietors of the above undertaking was held at the company's office, Princes-street, Bank. Mr. Russell, the chairman of the company, occupied the chair, and in the course of his address alluded to the Government measures in reference to railways, which he said were arbitrary in the extreme, and would fail in the object they intended to remedy. The secretary then read the report, which was very voluminous, and from which it appeared that the receipts during the last half-year had been £153,912 19s. 8d. The number of passengers conveyed has been 645,481, and, taking the aggregate mileage travelled (13,861,971), there has been a daily average of 1,064 persons travelling the whole distance. The balance at the disposal of the proprietors is £51,127 4s. 2d., and a dividend of $1\frac{1}{2}$ per cent. on the amounts respectively called up was declared. The expenditure during the half-year has been £73,408 11s. 11d., leaving a net balance in the hands of the company of £80,504 7s. 9d. The report then went on to show the favorable progress of the works on the line, and referred to the exorbitant price of fuel, the sum of £16,500 having been paid during the last half-year for coke alone. Mr. Brandreth moved the adoption of the report, which was seconded by Mr. Dance, who, being acquainted with the *locale* of the Forest of Dean, thought the directors would be able to get coals, which abound in that place, at less than half the money they now paid for that article. Mr. Heyworth congratulated the proprietors on their expenditure being £4,000 less this half-year than the preceding. Mr. Gordon, in a long speech, condemned the Government measures respecting railroads, and referred to the removal of the West India packet station from Falmouth to Dartmouth. He said it was to the interest of the Great Western Railway Company to endeavor to keep the packet station at Falmouth, and frustrate the endeavors making by another company to get the station transferred to Southampton. He then alluded to the late inquest at Harrow, and contended that such an absurd verdict would not have been returned but by men who were prejudiced against railways. Several proprietors having addressed the meeting, a resolution was carried to the effect that the directors should apply to Parliament (if necessary) for power to decrease their present numbers (twenty-four). Mr. Brunel, the engineer, in answer to questions, said that he expected the line would be opened on the 1st of June the whole distance. The following gentlemen having been re-elected directors, their term of office having expired, viz., Messrs. Barlow, Bright, Gibbs, Maze, Mills, and Tothill, a vote of thanks was passed to the chairman, and the meeting broke up.

Opening of Stockton and Hartlepool Railway.—On Tuesday week, the line of railway from Stockton to Hartlepool was formally opened by the directors of the company. About 12 o'clock, the directors and a number of other gentlemen residing in the neighbourhood assembled at the railway station at Stockton, which is situated at the east side of the road leading from Stockton to Norton, adjoining the Clarence Railway. On starting they were much cheered. They proceeded along the Clarence line, and by the Norton Junction, until they arrived at the Billingham Junction, where the new line leading from Hartlepool commences, and which is about three miles distance from Stockton, and about nine miles from Hartlepool; the distance between the two towns, by the railway, being about twelve miles. On various parts of the line the train stopped, and the gentlemen inspected the works, particularly the viaduct, which is thrown across a piece of marshy ground called Greatham Bottoms. The viaduct is about half a mile in length, and contains 92 arches. On various parts of the line, as the trains passed, they were saluted with cheers, and colors were hoisted on various eminences. A little before two o'clock the trains arrived at the Middleton station, at the south side of Hartlepool, which is the present terminus. They were received by a number of friends belonging to Hartlepool, who saluted them with cheers. The party proceeded to the head inn in Hartlepool, where they partook of a substantial repast. Soon after three o'clock the party again took their seats, and the trains returned amidst loud cheers, and the music of the band which accompanied the party.

Railway Trip Extraordinary.—A few days ago the workmen employed at the engine manufactory belonging to the Birmingham and Gloucester Railway Company, at the Bromsgrove station, perceived a wagon laden with quarry stones coming down the incline at such a frightful rate that they had hardly time to consider what they had better do under the circumstances before it dashed past them at the rate of nearly 100 miles per hour. They would probably have had time enough to overturn the vehicle, but wisely determined to let it pursue its wild career, for fear that they should not have time to clear the line before the Birmingham train (which was nearly due) arrived, and which might have led to the most dreadful consequences. Fortunately the wagon was seen by some parties on the line about three miles beyond Bromsgrove, and they hastily procured a number of scotches (thick pieces of wood), and laid them at short distances upon the rails. The last scotch had scarcely been laid before the vehicle was upon the first, and so little was its speed checked by the obstruction that it seemed as if it would pass them all. However, after running over several it at length stopped without overturning, and without causing the slightest accident. It seems that the wagon was standing just above the top of the incline, and that either a carriage or engine slightly touched it, when, having passed the level, it dashed off at the rate we have described.

Responsibility of Railway Committees.—In the Court of Exchequer, on Monday, an action was tried, in which Mr. Rastrick, the civil engineer, was the plaintiff, and Mr. Gustavus Lambert, an Irish gentleman of large property, was the defendant. It appeared that in the year 1836, when the Dublin and Drogheda Railway Company Bill was before Parliament, Sir Henry Meredith and other gentlemen, amongst whom, it was alleged, was the defendant, sought to establish a rival company, and to bring under the notice of the Legislature a rival, and, as they contended, a better line of railway. A provisional committee was formed to superintend the proceedings in Parliament, and oppose the Dublin and Drogheda Bill, and a Mr. Pentland, a solicitor, was employed to conduct the opposition. The plaintiff made surveys, examined maps and plans, attended before a committee of the House of Commons, and in other respects performed services of importance in furtherance of the views of those who projected the rival line. The result of the opposition was that, when the Dublin and Drogheda Railway Bill got before the House of Lords, it was deemed expedient to buy off the opposing company, which was effected upon the payment of a considerable sum of money. The defendant was one of the provisional committee of the rival company, and it was proved had himself nominated some of the other members of the committee. The defence set up was, that the opposing company was not a genuine company, but a mere experiment by Mr. Pentland, who had induced the defendant and others to lend their names, and had employed the plaintiff without any authority from the members of the provisional committee.—Lord Abinger told the jury, the question was whether the defendant, by allowing his name to go forth as one of the committee, had not induced the plaintiff to give his services, and thereby rendered himself liable. If Mr. Pentland was employed by the committee to oppose the bill, he might retain the plaintiff, on their credit, if his services were necessary.—The jury found for the plaintiff—Damages £337.

Charges against Railway Servants.—At the last meeting of the bench of magistrates at Kingston, a porter of the Southampton Railway Company was charged with being drunk on the evening of the 17th inst., and with having neglected his duty, and Mr. Jones, the superintendent of the Kingston station, was charged with having been absent from duty on the same evening for two hours. The charge against the porter was not substantiated, as the evidence was not sufficient to prove he was intoxicated. The superintendent was convicted in the mitigated penalty of £5. On the same evening a collision took place between the Woking up-train and some wagons which had been left on the line, and it was stated, that if the porter had been in a fit state for duty the wagons would have been removed before the train came up. The damage done was not material, as signals had been made at some distance.

RAILWAY ACCIDENTS.

Collision on the Arbroath and Forfar Railway.—An accident, which might have been attended with fatal consequences, happened upon this railway on Friday last. The up-train, which leaves Arbroath at half past eight o'clock A.M., had just passed Clocksbriggs station, near to Forfar, when it came in collision with a ballast train coming downwards. There was a dense fog at the time, and the trains were not aware of their proximity until it was too late to avoid a collision. The engineers of both trains were seriously hurt, and one of the firemen had his collarbone broken. None of the passengers suffered any injury, except Mr. Campbell, governor of the Dundee prisons, who sustained a fracture of the leg. Both the engines are damaged considerably.

Accident on the Great Western Railway.—An accident occurred to the Lion engine attached to the short train to Maidenhead, which left Paddington at half-past 8 o'clock on Saturday morning last. Just as the train arrived at about the centre of the Hanwell viaduct it came to a sudden stop, in consequence of a large piece of iron attached to the engine becoming loose and getting entangled in one of the large centre wheels. A man was immediately sent back to the Hanwell station to have signals instantly hoisted to prevent the next train, which was expected in a few minutes, from running into the one delayed. After a stoppage of nearly an hour and a half (during which time none of the passengers were allowed to leave the carriages,) the engineers, with hammers and other tools, managed to clear the piece of iron from the wheel of the engine; but in consequence of some damage which had been done to the machinery in the course of their labors, the engine would not move an inch—the steam rapidly escaping, apparently from the bottom of the boiler. Long before this time the 9 o'clock down train, with the Hesperus engine, had arrived on the viaduct; and the only mode of getting forward with both trains was found to be to have recourse to the engine of the last train to push

behind. This was done, and the whole party arrived at Maidenhead about two hours beyond the usual time, quite as much annoyed at the conduct of the guards and other attendants as at the delay they had experienced.—*Times.*

Fatal Accident at the Canterbury and Whitstable Railway Tunnel.—On Monday last, as four laborers were engaged filling some railway wagons with sand taken from a bank adjoining the mouth of the tunnel, the sand beneath them gave way, and threatened the destruction of the whole of the men. Three of them, however, succeeded, with great difficulty, in extricating themselves from their perilous situation; but the fourth, a young man, about 23 years of age, named Gordon, was not so fortunate, and, in endeavoring to escape, he fell forward, and the bank from behind him, of the estimated weight of upwards of twenty tons, fell upon him and buried him alive. His companions immediately commenced digging for the body, and after unremitting exertions for above an hour and a half, they found the poor fellow's corpse, frightfully mutilated, with the face downwards, and the legs actually forced back over the shoulders.

FOREIGN RAILWAYS.

Paris and Rouen Railroad.—"The company," says the *Courrier de l'Eure,* "has entered into a contract, under penalties, for the construction of the whole of that part of the railroad which is to run from Poissy to Asnières, where it will join the St. Germain road. This contract includes two large bridges over the Seine, one at Besons and the other at Maisons. Another contract has been made for the execution of the two most important and difficult undertakings along the whole line, a tunnel of 3,000 metres between Rolleboise and Bonnières, and a cutting at Venables, in the arrondissement of Louviers. A third contract will shortly be concluded for the line between Poissy and Nantes. In fine, all measures have been taken for ensuring the completion of the whole road between Paris and Nantes in fifteen months, so that it may be brought into use in the summer of 1842."

Paris Railroads.—The new grand station for the Paris, St. Germain, and Versailles Railroads, in the Rue St. Lazare, is approaching to its completion. The Rue de Stockholm, in the rear of the building, which during the progress of the works has been closed, will soon be opened again to the public, the bridge which there crosses the railroad being finished. This bridge, which is 100 yards in length, is a masterpiece of construction, so far as it provides for the safety of those who have to pass it on foot; the path on each side, admitting four persons to walk abreast, being protected by a balustrade on each side, so that no accident can possibly happen. The entire bridge, though formed of timber, is as solid and strong as if made of stone or iron, and has undergone the trial of having left upon it for 48 hours 500,000 kilogrammes in weight of paving stones, without experiencing the slightest crack or deviation.

Belgian Railroads.—The works of the Belgium railroads progress rapidly; all the sections are finishing at the same time. The viaduct of Braine le Comte, which was not expected to be completed till 1842, will in a short time be opened; in the section from Soignies to Mons there is not any very considerable work to be constructed. It is considered certain that the railroad will reach Mons next September.

Letters from Hamburgh of the 11th inst. state that information had been received that the Prussian government, which, in granting a company at Berlin permission to construct a railroad from the latter town to Hamburgh had reserved to itself the privilege of selecting on which side of the Elbe this railway should be made, has ultimately decided in favor of the right shore of that river. This intelligence has caused the shares of the railroad that was in progress from Hamburgh to Bergedorff, on the same shore of the Elbe, to be considerably raised.

Accounts from St. Galmier, near St. Etienne, state.—Some days ago, at eleven o'clock in the morning, the engine which draws the train of wagons laden with coal for Roanne, when at the top of the hill near the Chateau de Jourcy, suddenly went off the rails, and was precipitated into a ravine, drawing along with it a carriage containing many people, among others one named Berchon, who has had his thigh broken. The stoker was horribly mutilated.

Prussian Railroads.—The Prussian government, to prevent as much as possible accidents arising on railroads from malevolence or neglect, has added to the penal laws of the country, by publishing an ordonnance, with clauses to the following effect:—"Every person who shall cause a rupture or derangement of the rails, or shall place any thing upon them whereby the wagons may be turned off the line, shall be liable to close confinement, with or without hard labor, for a term not exceeding 10 years. When any such derangement shall have caused the death or injury of any one or more persons, the punishment for the first offence shall be extended to from four to twenty years, and for the second offence to from ten years to the whole life of the offender. In case it shall appear that actual loss of life was premeditated, the delinquent is to be tried by the ordinary criminal laws. Whoever, by a simple act of negligence, shall place the safety of a train in danger, is to be liable to imprisonment for from three months to two years. If an accident thereby happens, from which death or injury ensues, the punishment is to be confinement with hard labor for from two to four years. All superintendents who may be negligent in the performance of their duty are to be liable to the above-mentioned penalties, are to be dismissed from their places, and declared incapable of being again employed on any railroad. Every director who shall not immediately discharge a superintendent who has been condemned by the tribunal is made liable to a fine of from 36f. to 360f."

RAILWAY NOTICES FOR NEXT SESSION.

The following notices of applications for Railway Acts intended to be made to Parliament next session, appear in the *Gazette*:—

For a line to be called the "Northern Union Railway," running from the Great North of England to the Durham Junction lines.

For a branch from the North Midland Railway to Doncaster.

For a line commencing near Neckinger-road on the Greenwich Railway, and terminating near Westminster Bridge.

For a branch line from the London and Brighton, to be called the "London, Lewes, Saint Leonard's, and Hastings Railway."

For an extension to Worthing of the Shoreham branch of the Brighton Railway.

For a branch line from the Brighton Railway, commencing at Horley, and terminating at Horsham, both in Surrey.

For a line to Scarborough from the York and North Midland Railway, with a branch to the Whitby and Pickering line.

For a line to be called the "Westminster Bridge, and Greenwich, Croydon, Brighton, and South-Eastern Junction Railway, by way of and including Kennington, Camberwell, and Peckham." This line is to commence at Westminster Bridge, and terminate at Deptford, on the Greenwich Railway, with a branch from the Old Kent Road to New Cross, on the Croydon line.

For a line from Norwich to Yarmouth.

For an extension of the Northern and Eastern Railway to Cambridge.

For a railway from Falmouth to join the Bristol and Exeter, near Cowley Bridge, Devon.

For a line from Deptford on the Greenwich Railway to Chatham.

For an extension of the Saundersfoot Railway (Wales).

For the "Central Kentish Railway," from Deptford to Deal, with branches.

For the "West London Railway Extension" (late Thames Junction).

For a branch line to Evesham from the Birmingham and Gloucester Railway, with a secondary branch.

For a line from Leeds to Bradford—a branch of the North Midland.

For branches from the South-Eastern Railway to Canterbury, and Ramsgate, and Margate.

For a branch from the same main line to Maidstone.

For a branch to Hastings.

For an alteration of the Blackwall Railway depôt in Fenchurch street.

LITERARY NOTICE.

The Railways of Great Britain and Ireland, practically described and illustrated. By Francis Whishaw, C. E. London: Simpkin, Marshall, and Co.

The experimental and speculative part of Mr. Whishaw's important work on the Railways of Great Britain, we have already noticed; we have now to speak of it as a *book.* A complete description of all the railways of the kingdom, tracing their progress from the commencement of each undertaking to its close, with detailed statements of the works, and their traffic, cannot fail to prove of great interest to the various capitalists who have embarked in those undertakings, whilst to engineers it will serve as an invaluable guide and book of reference. The following outline of the account of the London and Birmingham railway is given in the preface as an example of the extent of information conveyed on most of the lines of railway then opened to the public.

"First then in order, is the introduction; second, the Acts of Parliament; third, the different openings of the line; fourth, the general course of the railway; fifth, the gradients; sixth, the gauge of way, &c.; seventh, the description of permanent way, draining, and fencing; eighth, the earthworks; ninth, the viaducts and bridges; tenth, the tunnels; eleventh, the stations and depots, including the cooking department; twelfth, the description of coke purchased, &c.; thirteenth, the passenger carriage department; fourteenth, the wagons department; fifteenth, the trains; sixteenth, the fares—passenger, traffic, &c.; seventeenth, the locomotive engines; eighteenth, the establishment; nineteenth, the cost of the undertaking; twentieth, the original estimate; twenty-first, the annual expenditure; and lastly, the annual revenue."

It will be seen from the preceding extract that Mr. Whishaw's intention was to give the most ample details of the railway system of Great Britain, and in most instances he has fully realised the design with which he commenced. In some few cases we regret to perceive he has occasion to complain of the illiberality of the directors or managers, who refused to give the information he required, and which was willingly supplied him on most of the lines of railway. Altogether, however, the information collected is very complete. The work is also illustrated by many well executed engravings, in which the distinctive locomotive engines are represented. The practical experiments which we have before noticed, and the plan of reciprocating railways, are appropriately added to the work; but do not interfere with the connected history of the different railways. To many they will be considered with, perhaps, greater interest than the statistical details. The time that must have been bestowed in making the former record of practical observations, proves the indefatigable zeal of Mr. Whishaw, and his determination not to spare any pains that would render his work more perfect. The minute care with which his plans and estimates are formed for a single line of road for his reciprocating system of railway conveyance, shows that he

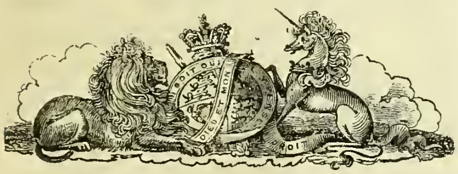
has devoted much attention to the subject, and that his calculations may therefore be depended on. This part of the work is to the speculative engineer peculiarly attractive. Though we do not think the mode of carrying on the traffic, on a single line, proposed by Mr. Whishaw, would be found convenient, whilst it would be attended with delays; we feel convinced that a single line might be made fully to answer all purposes on those roads where the traffic is not of first class importance.

TO CORRESPONDENTS.

Mr. E. Rowland *will find the Specification he requires, in No. 81 of the* "Inventors' Advocate."

The patent of Messrs. Dyer and Hemming, *for manufacturing carbonate of soda, was taken out before the* "Inventors' Advocate" *was published.*

The patent to which Mr. Mellin *refers, is not in the list of patents granted for the last fourteen years. It has expired, unless an extension of time has been obtained.*



THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, FEBRUARY 27, 1841.

When claiming for inventors the right to the full benefit and enjoyment of the property they have created, it is desirable to determine the principle on which that right depends, and to examine whether its possession be injurious to the interests of the community. It is the more necessary that these questions be well examined, and that the foundation of the right to the property of the mind be well established, as the prevalent opinion is that the monopolies by which such property is preserved are inimical to the general welfare. It is this feeling against these alleged monopolies, increased no doubt by the recollection of the oppressive monopoly-grants of former sovereigns, that has excited a prejudice against the claims of inventors, and has increased the difficulties they encounter in endeavoring to obtain the protection of the law.

The position we have contended for throughout, when discussing this subject, is, that the inventor has a stronger natural right to the produce of his skill and industry than any landed proprietor has to the estates he possesses. It is not from a wish to shake the foundations of landed property that we maintain this position, but to show that the rights of inventors have a still more solid basis; and that they ought to be at least equally protected. Judge Blackstone, in his treatise on the rights of property, considers the question *ab initio*, and shows that the right to exclusive possession of any portions of land, is but a conventional arrangement for the good of society, and is founded on no natural rights. Alluding to the indifference usually exhibited as to the origin of this right, Blackstone observes:—

"We think it enough that our title is derived by the grant of the former proprietor, by descent from our ancestors, or by the last will and testament of the dying owner; not caring to reflect that (accurately and strictly speaking) *there is no foundation in nature or in natural law why a set of words upon parchment should convey the dominion of land; why the son should have the right to exclude his fellow-creatures from a determinate spot of ground, because his father had done so before him*, or why the occupier of a particular field, or of a jewel, when lying on his death-bed, and no longer able to maintain possession, should be entitled to tell the rest of the world which of them should enjoy it after him."

It is only because found more advantageous to the general interests of the community that the soil should be cultivated, and to prevent constant broils and contentions, that the arrangement of allowing the appropriation of land became gradually adopted. It is thus, strictly speaking, only a conventional right; and as every inhabitant of a country has a natural lien on the soil for his subsistence, the absolute right to property in land becomes, when resolved into its first principles, only a *trust* held for the good of the public.

The right to property produced by the exercise of mind depends on a different, and more independent foundation. The property claimed is not fenced off from the common stock and appropriated; but it is an absolute new creation, which the inventor calls into existence for the benefit of his species. If there be any kind of property to which a man may be said to have a natural right *par excellence*, it is surely such as he has himself produced; property which without the exercise of his thought and labor would not have existed; and which derives an additional claim to protection from the fact, that the value of the property itself is founded on its utility. To object, therefore, to give an inventor full protection for the produce of his inventive genius; brought to perfection probably after the expenditure of much care, labor, time and money, seems to be at direct variance to the principles which guide the protection granted to property that has a less solid basis on natural right, and it is accompanied also with manifest injustice.

We know not why such property should be stigmatised by the obnoxious name of monopoly. It is really and substantially property; not a monopolising appropriation of general rights, as were the monopolies of old, of which some relics still exist in this kingdom. The exclusive right to work a profitable invention is, in fact, no more a monopoly, in the worse sense of the term, than the exclusive right which a landholder possesses of cultivating his allotments of ground. It is, indeed, one of the great hardships to which inventors are subjected that the property they create, though depending on the soundest principles of right and justice, is not protected by the common law. The common law had its origin in times when manufactures were in the lowest grade of progress; when inventive genius in this country had not been cultivated; consequently there was no provision made for the protection of property the nature of which was then unknown. It is thus that we can account for the inventions being placed beyond the pale of the law. The mode of remedying this inconvenience, when the advance of manufacturing skill made it evident, was to purchase protection from the Crown; in the same manner as the most baneful monopolies were sold to meet the lavish expenditure of the Court; no distinction being made in the form of protection between a grant to monopolise an old established trade, and a grant to protect the exercise of one newly created. This system with modifications has continued to the present day. Patents for inventions are still regarded as monopolies instead of as rights, and the protection to such created property is an act of favor purchased from the Crown, not a matter of right to which the owners of all other property lay claim.

Having thus stated broadly the claims of inventors to enjoy the fruits of their labor, we shall next week examine how far the enjoyment of this right involves any injury to the public.

NEW INVENTIONS.

SCULPTURING IN WOOD.

The following account of a new process for sculpturing in wood, invented by Messrs. Frantz and Graenaker, is translated from *Le Fanal.*

In this process, by means of which bas-reliefs, and large and small objects, are accurately sculptured, and for the application of which M. Graenaker already possesses models which admit of his undertaking extensive works, the wood employed is burnt or converted into charcoal. This effect is obtained by means of a strong pressure; for which a lever is used for multiplying the power five times, the action of which lasts about 20 seconds, and by an iron mould made red hot. The layer of charcoal formed ought not to be more than from two to three milletres, and should easily separate on the application of a brush. The wood ought previously to be steeped in water, and the burning mould should act intermittingly, in order to allow the steam which is formed to escape, the expansion of which might remove some pieces of the wood and injure the work. After burning for 20 seconds, the wood is removed from the pressure, and thrown into water, to stop the burning of the charcoal, and to facilitate its dispersion on the application of the brush. By repeating the operation as many times as the depth of the mould requires, a figure in relief is obtained, which reproduces the impression of the original model with accuracy and neatness.

The operation becomes more easy in proportion to the spunginess of the wood; consequently the commonest woods are best adapted for sculpturing objects by this process. Their durability is also very considerably increased, and the appearance of the sculptures produced in this manner from the poplar or from the chestnut tree, bears a strong resemblance to the wood of an old walnut tree, and the effect is very pleasing. The society of encouragement have awarded a gold medal to Messrs. Graenaker and Frantz for this invention.

STEERING STEAM-SHIPS WITHOUT RUDDERS.

We published an article in a former number of our journal, on the applicability of steam power to guiding as well as propelling ships, and pointed out the advantages which woult result from such an application. We have since had occasion to notice contrivances recently invented for this special purpose; but we were not aware at the time our first article was written, that a patent had been granted two years ago to carry the same object into effect. The following is a description of the mode by which the Chevalier de Rigal, the original patentee, proposes to guide steam-ships by the alternate action of their paddles.

Let it be supposed that a steam-boat of 400-horse power is required to be built; then there will be constructed four cylinders, each of 100-horse power, instead of two cylinders, each of 200-horse power. This arrangement will have the advantage that the different pieces could be constructed, transported, and repaired with greater facility. There will be also placed two cylinders on each side of the vessel, which would work alternately together, but separately from the two other cylinders, which would work on the other side of the vessel. The advantages of this are, that the pistons would work alternately on the same side or place, and the swinging motion, which is so disagreeable, and also so destructive to the machinery and the ship's crew, will be totally obviated. Another great advantage is, that one man, without the assistance of a second or a third, would be enabled to direct the vessel by placing himself before a table, which will be fixed in the middle of the deck in a little pavilion, to be erected for preserving the instruments and other articles necessary to navigation. Upon this table in the centre would be fixed a sextant, on which would be marked the degrees of the 400-horse power of the engines; and by the direction of a handle which turns this sextant, and a valve, to allow the steam to escape into the cylinders, more or less force can be communicated to the right or to the left side engines; which would give the ship an oblique course without the interposition of a rudder, which always produces a slacking of the ship's speed. On the left angle of the same table would be a dial, on which would be likewise marked the degrees of the total steam power, and by another little handle which turns this dial, a valve placed in the generator can be opened or shut, in order to give the vessel a speed more or less accelerated, or to stop it altogether. By such an arrangement the ship's captain, or the pilot, or the engineer alone, can direct the vessel and perform the most rapid evolutions, which would be the means of avoiding collisions, now so frequent. In storms, when the noise of the wind, the confusion of the ship's crew, and the sound of the paddle-wheels, hinder the orders of the captain from being understood, a ship is often abandoned to her fate. The same will occur if any of the persons who are appointed to direct the vessel, the machinery, &c. &c., are sick or dead. But through the application of this improvement only one person is required for directing the vessel, which may be done in so easy a manner, that no accident need happen from the conduct of the ship.

AEROSTATIC PERCUSSION BOMB BALLOON.

La Presse publishes a letter, signed "Vennelar, Ancient Captain of Artillery," which states that the writer had been present in a foreign capital at several experiments made with what he calls aerostatic percussion bomb-shells, which the inventor caused to explode in the following manner:—"A mass of trees of about two miles in circumference was marked out as the object to be attacked. Several stations were then fixed for the departure of the projectiles at two, four, and six miles distant from the point to be attacked. The inventor then, having attentively observed the direction of the wind, let off a pilot balloon sustaining a weight proportioned to its size. He then carefully counted the minutes which the balloon required to arrive at the point to be attacked. He then fixed a kind of spring to a moderate-sized balloon, which would let fall (according to the number of minutes indicated by the pilot balloon) a shell, which caused frightful destruction to the first object with which it came in contact, and every spark from it caused all the combustible matter within its reach to ignite, without the possibility of being extinguished." *La Presse* publishes this letter for the purpose of proving the absurdity of fortifying Paris, as those balloons can be made to pass over the fortifications, and burn the city, without danger from the forts about to be erected.

ALLOY OF TIN, FOR TINNING CAST-IRON.

Tin, when unadulterated, is made to adhere to cast-iron with great difficulty, and its adherence is not firm enough to constitute a coating of any durability. M. Budi has succeeded in inventing an alloy, which not only adheres very powerfully to cast-iron after it has come out of the sand moulds, and without any necessity for its being turned, but which also possesses the advantage of being less fusible, more durable, and considerably whiter than pure tin. Cast iron plated, will be of great use on many occasions, and will perhaps be put in general requisition for household purposes among the poorer classes. It will be a great improvement on the pans made of plain cast-iron, which are attended with the inconvenience of communicating an unpleasant taste to the food, and which are also extremely difficult to keep properly clean. Further, the alloy of M. Budi, on account of its durability and whiteness, will even be preferred to unadulterated tin, for the usual tinnings on copper; because these platings will be much handsomer, and much more durable, and the additional expense is inconsiderable. This alloy is composed of,

Tin	0·89
Nickel................	0·06
Iron..................	0·03
	1·00

It entirely dissolves in hydro-chloric acid. M. Budi has taken out a patent for the process.

NEW MODE OF RAISING WATER.

We translate the following from the *Moniteur Industriel*; we were not aware that such a machine had been put in practice in England:—"An English engineer, M. Alcock, brother to the director of the forges at Denain, has just made trial in England of the invention, for which he has taken out a patent, and which consists in raising water from the mines without pumps, by means of a ventilator, which forcing out the air through a tunnel, which admits the water at the lower part, raises that fluid in drops. The result appears to have exceeded all expectations, and if other establishments of those machines should confirm this first trial, which took place at Wigan, the method of draining now in use will be entirely changed."

BENKLER'S NEW OIL-GAS LAMPS.

This invention, according to Dr. Liebeg, professor at Giessen, may be considered as one of the greatest improvements in lamps since the Argand. It principally consists in feeding the flame with heated air, and directing it at a certain angle to the base of that flame, by which means it is not liable to become cooled by exposure to currents of air which do not assist the combustion. In the Argand lamps it is not only the air requisite to supply the flame, which enters into the chimneys of glass but almost double and even triple the quantity of atmospheric air enters also, which has an injurious effect on the combustion. These useless currents of air affect the quality of the light, for as the air becomes heated by the flame it deprives the latter of a part of its heat and a proportionate quantity of its illuminating power. Thus one of the most interesting problems in the theory of illumination has been to avoid this cooling, and consequently to increase the brightness of the light. This problem Benkler has solved in the most extraordinary, the most simple, and the most beautiful manner. In Benkler's lamp the flame is brought to a white heat. The power of its light can only be compared to the flame of phosphorus burning in oxygen, which it nearly equals in clearness and brilliancy. The apparatus of Benkler is applicable at very little expense to lamps of every description. Any kind of oil may be used, even the commonest whale oils. They produce a flame, which is quite as free from smell as that of the purest oil."

[This lamp, the description of which we take from *Le Fanal*, appears to be a combination of the properties of the solar lamp, and of an invention, for which a patent has recently been taken out in England, for heating gas before it is burnt.]

IMPROVEMENT IN POWER-LOOMS WITH JACQUARD MACHINE.

Since the introduction of power-looms many attempts have been made to use a number of shuttles, but as yet without success. This week, however, we have had an opportunity of witnessing, in full operation, Messrs. Naylor and Crighton's patent power-loom, weaving Kidderminster carpeting, with eight shuttles, and making their changes with as much regularity, and working as easily, as if there were only one shuttle employed. Those gentlemen are also just completing a loom for weaving cotton ginghams with six shuttles; and from what we have seen of the carpet loom, we have no doubt that it will effect all the purposes for which it was designed. From the principle on which the shuttles are moved it would appear that any number of shuttles may be used, the loom being applicable to all descriptions of goods, from the heaviest Kidderminster carpeting to the finest fancy embroidered silks, where a number of shuttles are required to form the pattern. Perhaps the greatest advantage of this invention will result from its weaving the Kidderminster carpeting by power, instead of, as now, by hand, the ancient mode of weaving, the weaver having to throw the shuttle with his hand. These advantages will be fully understood when it is stated that one loom will do fully four-and-a half times as much work as the hand-loom, the average length made by the hand-loom weaver being about forty yards of super per week, and the patent power-loom making fully thirty yards per day, and that too in a superior style, the patterns being fashioned exactly all of a size, so that there will be no difficulty in matching them in making up carpets, as is now experienced in hand made carpeting. In addition to all this, in this clever invention, one man will be able to attend to two or three looms, with the assistance of a boy or girl to each, and one man also will be able to superintend two or three of the lighter description of looms.—*Manchester Times.*

NEW FUEL FOR STEAM ENGINES.

The *Northern Bee*, of St. Petersburgh, 5th inst. states that M. Weschniakoff had discovered a new material for heating steam-engines, which takes less space and produces a greater heat than the best sea coal. The inventor calls this substance "carbolein." An experiment lately made on board the steamer *Sirius*, between Cronstadt and Copenhagen, proved that four pounds and a half of carbolein per hour produced sufficient steam to impel the vessel at the rate of seven Russian miles; that is a velocity one-half greater than that produced by sea coal.

THE SCHOOL OF DESIGN.

A copy of the report to the President of the Board of Trade, by the provisional council of the School of Design, has been laid before Parliament, by which it appears that the whole number of students who have entered since the establishment was opened, in June 1837, is 471. This excellent institution was formed under the auspices of Lord Sydenham, when President of the Board of Trade, by whose exertions a parliamentary grant of about £1,300 per annum was procured for its support, and that sum, we believe, has since been regularly continued. Apartments for the meeting of the council and school accommodation were obtained in Somerset House, and the management placed under the charge of a director and assistant masters. The provisional council consists of some of the most eminent of our modern artists, and of gentlemen extensively engaged in the silk trade. The managing director at present, we believe, is Mr. Dyce, a Scottish artist of known taste and excellence. The council have not as yet introduced the practical study of any manufacture except silk, for which they provided a loom and jacquard machine and the other necessary apparatus, and procured the assistance of a teacher, who gave instructions twice a week in weaving, and in the application of design generally to fabrics of the loom; but, owing to causes explained in the report, the council found it necessary to discontinue this class. For the second section of the classes of design for manufacture the council have resolved, that besides instruction given by the director to individual students, he shall deliver twelve lectures during the year, and that qualified lecturers shall be appointed to give oral instruction on particular subjects connected with the purposes of the institution, so that there shall be at the least twenty lectures during the season.

The report states, that with respect to the attendance of the pupils, the council have had to regret its irregularity and infrequency, but this is attributed on the one hand to the smallness of the number of those who, under the present discouraging prospect of employment, have come forward with the intention of devoting themselves exclusively to the pursuit of design for manufacture; and on the other hand, to the circumstance that a great majority of the pupils have consisted of apprentices or others engaged in trade, who can only command a limited time at intervals for the purposes of study. The fees have been reduced to four shillings per month for the morning and evening, and two shillings per month for the evening school. In providing materials of study, the council have endeavored to procure the best examples, ancient and modern, of ornamental art, to the extent that the means at their disposal have permitted. They have a publication in preparation on the subject of ornamental design, to serve as an elementary class-book for the government school, and for similar provincial institutions, as a hand-book of styles of ornament for the instruction of designers, and as a guide to the taste of manufacturers in their several branches of study. The council have also foreseen the necessity of extending the opportunity of elementary tuition by means of branch schools; and a branch school of design for the district of Spitalfields has, in fact, been opened, and in successful operation, for a period now of four weeks, at which we are enabled to state that the attendance is most regular, and the pupils, now amounting to 60, are steadily on the increase. This was the locality where a branch school was specially wanted, and it has been most successful. The school is open three evenings every week, under the charge of a master, who was brought up in the central institution at Somerset House; and the pupils are almost entirely the children of weavers. Funds were allowed for the outfit of the school, and for a salary of about £30 a year to the master from the government grant; and the local committee have obtained the use of the National School-rooms. This local committee consists of 24 in number, one half masters and the other half men; two of whom (one master and one man) attend regularly each evening that the school is open. We are glad to learn that the school is supported with great zeal by the operatives, who are most anxious for its permanent support and extension. It is likely that it will lead to a much better amalgamation of feeling between them and the masters than has hitherto existed in Spitalfields. The proceeds of the ball which her Majesty has been graciously pleased to patronize, are to be applied, we hear, for the purpose of providing means for the permanent establishment of the Spitalfields branch; for building a school-house, and providing models and casts. The men are at present employed in an extraordinary work of art in the process of weaving, to show that the charge of inferiority made against them, in comparison with the French weavers, is unfounded. The work will be executed on a surface of immense size, and will require a greater complication of machinery than has ever hitherto been applied to silk weaving. Since the prohibitory duties were taken off the silk trade in this country has been generally prosperous; and if our artizans had the advantages of education in the art of designing, it is the opinion of the most competent judges that our fancy silks, requiring the greatest display of taste and fashion, would soon be able to compete with the finest productions of the French loom.—*Morning Chronicle.*

HAND-LOOM WEAVERS.

Summary of the Report of the Commissioners on the condition of the Hand-loom Weavers, presented to both Houses of Parliament.

We have inquired into the condition of the hand-loom weavers throughout the United Kingdom. We have stated that, as a body, they are in a state of distress; that the great cause of this distress is a disproportion between the supply of hand-loom labor and the demand for it; the demand being, in many cases, deficient, in some cases decreasing, and in still more, irregular, while the supply is, in many branches, excessive, in almost all has a tendency to increase, and does not appear in any to have a tendency to adapt itself to the irregularities of the demand.

In considering the second of the objects proposed to us by your Majesty's Commission, namely, the reporting whether any, and if so, what measures can be devised for the relief of the hand-loom weavers, we were governed by the result of our previous inquiry. It having been ascertained that the principal cause of the low earnings of the hand-loom weavers is the disproportion between their numbers and the demand for their labour, it follows that no measures can effectually raise their earnings, except by getting rid of that disproportion; but even while the disproportion continues, the condition of the weaver would be improved by any cause which should render the demand for his labour more steady, or diminish the price or improve the qualities of the commodities on which his wages are expended.

The remedies for the distress of the weavers appeared, therefore, to be reducible to three classes—first, those which aim at increasing or rendering more steady the demand for their labor; secondly, those which aim at cheapening or improving the commodities on which their wages are expended; and, thirdly, those which aim at diminishing their number, or preventing its undue increase.

We then gave an outline of the principal measures which appeared to us the most expedient for the purposes of increasing or rendering more steady the demand for the labor of hand-loom weavers, and of cheapening or improving the commodities on which their earnings are expended.

As the principal means by which all these purposes may be effected; by which the trade of the country, both internally and externally, may be made more steady; by which the exportation of the products of our own looms may be promoted, and the food and habitation of our laboring population may be improved, we have recommended the substitution, for the present anomalous and fluctuating corn duty, of a duty, either to be annually reduced, or to be permanently fixed at a low rate; and such a change in the duties on timber as may no longer exclude from all buildings intended for the use of the great majority of the people, the timber which is cheapest and best. And we have recommended further measures for promoting the healthiness of the dwellings of the laboring classes, and for the improvement of our foreign trade.

In order to cheapen the material on which one class of weavers are employed, and thereby increase the demand for their labor, we have recommended the abolition or diminution of the duty on organzine.

For the purpose of further increasing that demand by the improvement of British patterns, we have recommended the extension and protection of copyright in designs, the establishment and promotion of schools of design, and the general cultivation of the popular taste.

Believing that the cost of production to the manufacturer is much increased, and, consequently, the demand for hand-loom labor much diminished, by the embezzlement of woven goods, and of the materials of weaving, we have recommended measures for its more effectual repression.

Believing the restrictions on the manufacture and sale of Irish linen to be mischievous, we have recommended their abolition.

And believing that hand-loom weavers suffer even more than the laboring classes in general under the obstacles to the free use and circulation of labor imposed by combinations, we have recommended measures for restoring liberty to the working classes by depriving combinations of their powers of intimidation.

We have, lastly, considered the means by which the number of hand-loom weavers may be diminished, or their undue increase prevented. After remarking that the restoring freedom to the labor market will, to a certain degree, effect these purposes, we have directed our attention to two auxiliary measures—emigration and education. We have stated our fears that the weavers will not derive much direct and specific advantage from emigration. Nor have we encouraged the hope that they will be peculiarly benefited by the extension of education. But believing most firmly that the whole body of the laboring classes would derive benefit from a general system of education, under which the community should be bound to supply the means, and parents, and all others filling the place of parents, to use them, we have suggested an outline of a plan by which such system may be introduced.

London, Feb. 19, 1841.

THE PLAN OF TAMPING WITH LOOSE SAND IN BLASTING

(To the Editor of the Inventors' Advocate.)

Sir,—From some articles inserted in your recent numbers, it appears that Mr. Roberts claims as a new invention, a mode of blasting by the use of dry loose sand.

The blasting by loose sand, which seems to have been represented to you, and which you appear to consider, as a new discovery, is not really so, but has long been known. You will find a paper on the subject, and containing a minute detail of the process, in the number of Nicholson's Journal for Dec. 1840, vol. 9, page 230.

I remain, Sir,
Your obedient servant,

Feb. 23, 1841. A. B.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING MARCH 1, 1841.

Monday	Entomological Society	8	P.M.
	Medical Society	8	P.M.
	Medico-Chirurgical Society (Anniv.)	3	P.M.
Tuesday	Linnean Society	8	P.M.
	Horticultural Society	3	P.M.
	Uranian Society	8	P.M.
	Civil Engineers	8	P.M.
Wednesday	Society of Arts	7½	P.M.
Thursday	Royal Society	8½	P.M.
	Antiquaries Society	8	P.M.
Friday	Botanical Society	8	P.M.
	Royal Institution	8½	P.M.
Saturday	Asiatic Society	2	P.M.
	Westminster Medical Society	8	P.M.
	Mathematical Society	8	P.M.

ROYAL INSTITUTION.

Feb. 12.—Friday Evening Meeting.

Dr. Grant delivered a lecture " On the Structure and Development of the Tegumentary Organs of Animals."

From the external parts of animals are our perceptions of their beauty and distinctive characters chiefly derived. The varied lines and texture of their tegumentary parts, however, consisting of insensible epidermic coverings, and of a highly sensitive subcent skin so suitable to protect them from external injuries, to which they are exposed because of their delicate structure and rapid movements, awaken our highest admiration. The admirable adaptations thereof are visible in the whole range of the animal kingdom, in the tough and pliant covering of *Keratophytes*, the solid shells of *Echini* and *Mollusca*, the thin light coverings of insects, the soft epidermis of *Batrachia*, the scaly coats of cold-blooded fishes and reptiles, the bad conductors of caloric enveloping the warm bodies of birds and quadrupeds in polar regions, &c., &c. Dr. Grant described the vascular sensitive outer layer of the skin, the subjacent fibrous elastic lsyer, and the numerous blood-vessels, nerves and absorbents which permeate the whole texture; also the numerous small sweat-glands, oil-glands, and hair follicles, which are imbedded in the skin, and open by minute ducts on its surface. The sweat-glands of the sheep are very large, and each fibre of the wool is provided with two oil-glands. Every hair or bristle of quadrupeds has its own follicle and its secreting pulp or vascular papilla, and increases by the addition of new matter to its base. The growth and development of the extra-vascular, insensible, epidermic parts exhibit curious phenomena, and these formed the principle topic of Dr. Grant's illustration. He stated that epidermis, hairs, nails, claws, horns, hoofs, and all horny spines, scales, and plates on the exterior of bodies, are identical in their nature and structure, being merely aggregates of small compressed, independent cells or *cytoblasts*, poured out in successive strata from the vascular surface of the true skin. The cytoblasts are at first small granular nuclei, possessed of independent vitality and growth; they form investing cells on their exterior, which have also an independent growth, and the changes they undergo are most extraordinary. Diagrams illustrated how they give origin to most of the internal tissues of the animal body, as cartilage, cellular tissue, crystalline lens, nerves, capillary vessels, &c., as also to the external insensible coverings, as feathers, scales of reptiles, plates of tortoiseshell, horns of ruminatia, &c. Cytoblasts are seen on the lining membrane of the heart, in veins, on the chorion, the amnion, and all mucous and serous membranes, and exhibit distinct vibratile cilia on mucous surfaces. Dr. Grant explained how by their rectilineal aggregation forming hairs, they are solid, have a fibrous structure, exhibit a filamentous decomposition, and are rendered stronger and more permeable to the oil of the sebaceous glands. The nails, he observed, are only hairs made flat by the shape of their follicles. The anterior portion of hoofs are large nails, their inferior horizontal part being thickened epidermis, and all vaginiform horns are but conical nails. The epidermis is the most universal covering of organized bodies, its lower soft loose cytoblasts, forming the *rete mucosum*, contain living parasitic pigment cells, and again within these are seen numerous minute colored embryos or parasites in the most lively movements. These parasites of the epidermic cytoblasts give rise to the varied hues of the tegumentary parts of animals, their excess produces the black color of the negro, and their absence albinos. These colored cytoblasts have an ephemeral existence, and are shed colorless in the negro, &c.; and those remsrkably organised beings, the epidermic cytoblasts, are constantly falling from the surface of man as dried and colorless scales.

Friday, February 19.

Mr. Tennent described the character, figure, and composition of the ornamental stones used for jewellery, and practically illustrated the method of cutting and polishing, &c. He dwelt principally on the degrees of hardness of the several substances in relation to a table or fixed standard, commencing with talc as No. 1, and ending with the diamond, the hardest substance in nature, as No. 10. The intermediate in their order are rock salt, calcareous spar, fluor spar, apatite, adulsris, rock crystal, topaz, and corundum. Few things are so remarkable as the value of the diamond, to which Mr. Tennent observed, although capricious to every thing else, fashion has been steady. No substance with it can sustain comparison; its brilliancy is unrivalled. The variation in glow of the opal, the refreshing tint of the emerald, beautiful as their appearance is on near inspection, are lost to the distant observer; but the diamond, whether in diadem or hair, flsshes around and proclaims its presence. The usual form of the diamond is the octohedron, though variously bevelled on edges; it is also found as a cube, with its facets frequently rounded. It is sold commonly by the carat, a weight of about four grains. If free from flaw, one of a carat in weight will fetch £10; but one of two carats, not £20 but £30; of three, £60; of four, £100. Beyond the last weight the value is enormously increased, but the purchasers are few. The finest diamond in Europe is in the possession of the King of the French. Its weight is 136½ carats, and its value £135,000. The Emperor of Russia has one of 193 carats, but its shape is bad. The principal diamonds in Europe do not exceed twelve in number. Those from one to ten carats are in general request. The relative value of an ounce weight was as follows:—Copper, 1d.; silver, 5s.; gold, £4; diamond, £160. These precious gems are used by the engraver, lapidary, jeweller, and others. Although so exceedingly hard, the diamond is a brittle substance, and it is a vulgar error to suppose that resistance to a blow is proof of goodness or of reality. Brilliancy is the best guide, and next crystalline form. Mr. Tennent went through the several classes of the ornamental stones, illustrating the subject with specimens and diagrams. For the next lecture the subject announced was—" The Laws which regulate the Voltaic Precipitation of the Metals," by Mr. Smee.

ENTOMOLOGICAL SOCIETY.

Jan. 25.—The Rev. F. W. Hope, F.R.S., &c. in the Chair.
Anniversary Meeting.

Messrs. W. Bennett, W. Sells, S. Stevens, and G. R. Waterhouse, were elected members of the council for 1841, in lieu of four members of the old council removed; and W. W. Saunders, Esq., F.L.S. was elected president of the society, in lieu of the Rev. F. W. Hope, by whom an address was delivered upon the state of the society, its progress and prospects. The society, he said, is slowly but steadily advancing, and its funds are in a favorable state, as appeared by the report of the auditors of the treasurer's accounts. It was announced that the prize of 10 guineas, offered by the society in conjunction with the Saffron Walden Agricultural Association, would be renewed, for the best memoir on the caterpillar of one of the *Noctuidæ*, which feeds upon the root of the turnip, including the most advantageous methods of preventing its attacks or of destroying the insects. The Rev. F. W. Hope also announced his intention of offering a prize of £10, for the best essay on the insects which attack apple and pear trees, with the best remedies for their destruction. Members of the society, agriculturists, horticulturists, and others, were invited to supply the society with a notice of such species of insects as might be proposed as proper subjects for future prize essays.

Feb. 1.—G. R. Waterhouse, Esq., in the Chair.

Mr. Westwood called the attention of the meeting to the state of the great picture, by Sebastian del Piombo, in the National Gallery, as described by Dr. Waagen. The picture had been transferred to canvass, on which it was fixed with paste, which material is now attacked by insects which are considered to be the *Anobium paniceum*, an insect well known to attack preparations of flour. The plsns suggested at a former meeting for the destruction of insects which attack paintings on panel or the stretching frames would be inapplicable to the present case; and it would be dangerous to saturate the back of the picture with any solution which would affect the paste so as to render it unpalatable to the insects, or sufficiently strong to destroy them. Mr. Gutch considered that in the case of so valuable a picture it would be most advisable to re-line the painting with fresh canvass, employing paste in which a little corrosive sublimate had been mixed. He had constantly used paste mixed with that material, and had always found it perfectly effectual in preventing the attacks of insects. Mr. Waterhouse, however, strongly objected to this, and proposed that an air-tight frame or flat box should be prepared to fit the back of the picture, leaving about an inch space, the air in which should be strongly impregnated with prussic acid.

A letter from the Rev. A. W. Griesbach was read relative to the economy of the pea beetle (*Bruchius granarius*), which he had found to undergo its transformation within the pea, and not in the earth. The completion of a monograph on the *Evaniidæ*, a family of *Hymenopterous* insects, by Mr. J. O. Westwood, F.L.S., was read.

CHEMICAL SOCIETY OF LONDON.

Feb. 23.—Professor Graham, in the Chair.

This was a preliminary meeting of the professional experimental chemists, convened by Mr. Robert Warrington, who, in conjunction with other practical chemists, has for some time entertained the opinion of the capability and room in the great metropolis for a select society devoted exclusively to chemical science. By the kindness of the committee of the Society of Arts, this meeting took place at the apartments of that institution in John-street, Adelphi. Among the leading scientific experimental chemists, we noticed Messrs. A. Aikin, J. T. Cooper, R. Phillips, Graham, Everitt, G. Lowe, Groves, Dr. Clarke, and J. P. Gaissiot. On Professor Graham being called to the chair, he briefly explained, that although the establishment of this society might be considered by some to a certain extent opposed to the Royal Society, yet he could not see how this idea could for a moment be entertained, seeing that almost every other society in the metropolis has arisen from that body. As science advances it is but fair to conjecture that means will develope themselves to render every facility to its progress; and as the Royal Society is necessarily an important and exclusive body, one of the great ends, attained by the establishment of the chemical society, would be to bring rising genius in the right path to merit hereafter the higher honor.

Mr. Warrington then addressed the meeting. He said he had long anticipated this meeting of scientific chemists, and he doubted not but that they would one and all join in the establishment of the chemical society. The objects proposed were:—the reading of notes and papers on chemical science,

(in the fullest meaning of the term,) and the discussion of the same. The formation of a laboratory in which might be carried out the more abstruse and disputed points connected with the science. The establishment of a collection of chemical preparations, of as varied a nature as possible, for reference and comparison, and thus to supply a very great desideratum in the metropolis. The formation of a library, especially including the works and publications of the continental authors, was also one of the leading objects.

Dr. Clarke then rose, and proposed that a society be formed, to be called the Chemical Society of London; at the same time proposing the names of twelve eminent chemists to act as a provisional committee, to investigate the matter, and to report on the same at a general meeting at some future time, whenever their arrangements were completed.

M. J. T. Cooper then proposed that Mr. Robert Warrington act as secretary *pro temp.* to the provisional committee, which was seconded, and carried unanimously. A vote of thanks having been given to the chairman, the meeting adjourned.

[It has always been a matter of surprise to us that, while every other society has, as it were, emanated or separated itself from the Royal Society, the scientific chemists of the metropolis (we do not allude to chemists and druggists, who, for the most part, are no more entitled to the first appellation than to that of a licensed practitioner in medicine or surgery) have not bestirred themselves as those in the other departments of natural science. The result of such societies must on all sides be acknowledged, when the labors of the whole are compared with the yearly bulletin of the Royal Society. It is, indeed, no more than is to be expected from the rapidity of the march of intellect of late years, and we trust that this project will meet with the encouragement among men of science, which it deserves.]

LINNEAN SOCIETY.

Feb. 15. Bishop of Norwich, President, in the Chair.

The Marquis of Northampton was elected a fellow, and Mr. Gordon an associate.

Mr. Gould exhibited two specimens of *Melopsittacus undulatus*, Gould (undulated parrots), which he had succeeded in bringing alive to this country; they are considered to be the only true singing or warbling parrots in the extensive family. At times they are very noisy, and continue their sounds when other birds are at roost. Beautiful figures of them may be seen in Mr. Gould's recently published number of his work on the birds of Australia. A gigantic *truffle* was also on the table from Austialia, together with a series of objects of Natural History from China, presented by Mr. Reeves, including two kinds or varieties of the Edible Swallows' Nests: the varieties in a measure depending on the nature of the rock from which they were taken. The birds usually build their nests in caves or secluded parts of rocks; and on conversing with Mr. Lay and Mr. Cuming respecting their formation, we were informed that the prevailing opinion as to their being constructed of partly digested sea-weed is altogether erroneous; both travellers have opened the gizzards with a view to corroborate the above statement, but they have only found in the interior flies and insects, upon which these birds exclusively subsist. The glairy viscid matter of which the nests are solely formed, is secreted by glands situated at the upper part of the gizzard. In our common swallow a similar process takes place; the mud is swallowed by the bird, and after a short time ejected, together with this binding or glairy secretion, of which the nests are formed. A paper was read entitled "Observations on some new or uncommon Fossil Zoophytes," from the tertiary beds of Germany, by a foreign member of the society.

NUMISMATIC SOCIETY.

Feb. 17. Professor H. K. Wilson, F.R.S., in the Chair.

Dr. Bigsby, F.R.S., and Capt. H. P. Bailey, were elected members of the society.

A paper was read by J. H. Burn, Esq. The memoir commenced with an account of the state of the mint upon the restoration of Charles II., in 1660; the annihilation of official seals; proclamation of the non-currency of the money of Cromwell, Thomas Simons and his brother Lawrence, and his apprentice Thomas East, who were engravers at the mint. Simons was at first reappointed, but the old process of hammering still continued. Blondeau's proposal for the mill was laid aside, on account of the expense, and was accordingly abandoned by the parliament, but adopted by the new government. In 1661, the Roettiers, natives of Antwerp, were imported from Paris, and the coining by the mill and press commenced. In 1662, April 18th, Sir Ralph Freeman and H. Slingsby, reported to the council, that they had proposed to Simons and Roettiers to send in models for premiums. His Majesty accepted the dies of Roettiers, and Simons either withdrew, or was dismissed from the mint. In 1662, Blondeau was made a denizen, and chief engineer of the mint; and on the 3d of November the mill was established by warrant, but no coinage took place till the 21st, it commencing with the purchase money for the sale of Dunkirk. In 1663, a commission was directed to consider about the mint, which originated the competition coin of Simons, (a specimen of which is preserved in the British Museum), the finest work in Europe of the day. Simons left the mint in 1665, and appears from Mr. Nightingale's paper, since read, to have died of the plague. John Roettiers then became chief engraver. His son John was born at Paris in 1661; his second son at London, 1663; and his third son, Nerbert, in 1665, at Antwerp. March 25th, 1666, he was engraving the grand seal for the Admiralty. February 25th, 1666-7, the medal representing Britannia appeared, consisting of an altar supported by Pallas, Hercules, Prudence, Peace, and Mercury, bearing the inscription, NULLUM NUMEN ABEST. On the 4th March, 1666-7, he was directed to make the great seal, which cost £246 3s. 2d. In 1668, the £5 pieces from Roettiers' dies were issued for the Royal African Company. In 1671, tickets for the Theatre Royal, in Drury-lane, and the Duke's Theatre, in Covent-garden, were struck from the Roettier dies. In 1678, Roettier was modelling a silver horse for the King, the statue to be cast in silver of a yard high. In 1680, Henry Harris was added to the mint, and in 1681 he engraved the coronation medal of James II. Considerable confusion had, however, taken place in the mint, and Slingsby was made to surrender his patent in the Court of Chancery, 20th April, 1686. No new dies were engraved, the numerals 7 and 8 in 1687 and 1688 being punched on the final 6 of the old dies of 1686. George Bower and H. Harris engraved the coronation medals for William and Mary; and the copper coinage, in 1694, was granted to Sir Joseph Herne. Nerbert Roettiers, a very inferior engraver, and his son, retired to France. The old Roettier was absent at this time, and suspected of treasonable practices, and was placed under surveillance. He was proved to be guilty of great negligence with respect to the dies, and finally was so annoyed that he retired upon his property to Red Lion-square. The rest of the paper related to the French mint, and the genealogies of the Roettiers.

Mr. J. A. Stothard exhibited a steel-halt or punch, by Joseph Roettiers, of a medal of Louis XIV.

Mr. Akerman exhibited the drawing of a very remarkable gold coin found near Canterbury, forwarded to him by the Rev. E. Gregory, at the request of Lord Albert Conyngham.

Mr. Nightingale exhibited six small brass coins found by Dr. Walker among the ruins of Pœstrum.

ON THE INTOXICATING POWER OF WINE.
BY PROFESSOR BECK.

It is generally supposed that in wine the action of the alcohol upon the animal economy is modified by the other vegetable matters which are mixed or combined with it. According to this view, it is of course taken for granted, that the intoxicating power of wine is not so great as that of a mere mixture of the same proportion of alcohol with water. Before offering any remarks upon this point, it may be proper to introduce the following table, showing the relative powers of several wines, and other fermented liquors, on the supposition that the alcohol is equally effective as in distilled liquors:—Brandy containing 53·39 per cent. of alcohol, being taken as the standard, and set down as 100.

Brandy	100	Sauterne . .	24·34
Strongest Madeira	48·26	Claret (average)	21·38
Weakest do.	36·14	American wine	21·07
Port (average) .	42·33	Metheglin . .	19·79
Bucellas . . .	35·21	Ale	19·98
Sherry	33·75	Ale	13·12
Torres Vedras .	38·22	Cider (average)	1·76

From this table it appears, that two measures of strong Madeira are equivalent, in the amount of alcohol which they contain, to nearly one measure of brandy, and that about five measures of ale are equivalent to about one of brandy. It will, perhaps, be quite generally asserted, that the intoxicating powers of these liquors are not in the proportions thus expressed; and hence the opinion, that the effect of alcohol in wines and other fermented liquors is modified by the other vegetable matters which they contain. I apprehend, however, that the difference is not so great, all things being equal, as might at first be supposed. The following facts appear to me to throw some light on the subject.

New wine is said to be more intoxicating than that which is old, although the latter is usually more spirituous. The reason of this, undoubtedly, is, that the alcohol by time becomes more intimately combined with the water, and thus to a certain extent loses its power of intoxication. The union of alcohol and water is not complete until they have been for some time in contact; and hence, when brandy and water are taken into the stomach immediately after their mixture, the effect on the system is not very different from that produced by the same proportion of brandy taken separately.

Mr. Brande, in one of his papers, assures us, that, when brandy and water are mixed, and allowed to remain in combination for some time, the intoxicating power is not greater than that of wine, containing an equivalent of brandy. In wines the union of alcohol and water becomes complete by the process of attenuation; and it is, in my opinion, to this, more than to the controlling effects of the other vegetable matters, that we are to ascribe their less decided intoxicating powers; and, on the contrary, it is to the imperfect union that the ordinary mixtures of brandy and water owe their more energetic action on the system. I should also observe, that mistakes concerning the relative intoxicating powers of mixtures of alcohol and water, and of wines, may have arisen from the different modes in which they are ordinarily drank. A half pint glass of brandy and water of common strength contains an amount of alcohol but little less than the same measure of ordinary Madeira. And, if these portions of wine, and of brandy and water, should be drank in the same manner, the effects on the animal economy would not be so different as is generally supposed. Wine is usually taken in small quantities, and at intervals,—circumstances which must have a great effect in modifying its action on the system: and to these may also be added the fact, that its habitual use impairs the susceptibility of the system to its intoxicating power.

On the whole, there is reason to conclude, tha the difference in the intoxicating power of win

and that of the ordinary mixtures of water with the same proportion of alcohol, if it exist at all, is owing more to the intimate combination of the alcohol with the water in the former, than to any peculiar effect of the other vegetable matters contained in it. But, from the considerations above stated, I am inclined to believe, that after all, the difference is rather apparent than real.—*American Journal of Science and Arts*, vol. 28.

SCIENTIFIC MEMORANDA, AND NOTES ON ART.

German Mineral Waters.—(From Dr. Granville's Spas.) "All the cold mineral waters of Germany abound in carbonic-acid gas. Of twenty-one such waters, given in my analytical table, not fewer than seventeen yield from *five-and-twenty* to *forty* cubic inches of carbonic-acid gas in a pint, and are consequently highly effervescent. The others have not less than an average quantity of fourteen cubic inches of the same gas in a pint. * * The quantity of carbonic-acid gas in the eighth part of an imperial gallon (a little more than a pint), of twenty-three different waters of low temperatures, out of thirty-two English mineral springs, is under two cubic inches. * * It will be seen that not only are the English mineral waters totally deficient in some of the salts to be found in those in Germany, which give to a mineral water virtues in the cure of certain disorders that one would seek in vain in waters not endowed with the same salts, but that the total or absolute quantity of the saline ingredients altogether—particularly of those of a solvent or purgative character—is inferior in the mineral springs of this country."

Life Apparatus for Shipwreck.—Last week the Society of Arts awarded the large silver medal to Mr. Harison, of Newhaven, for the invention of an apparatus for saving the lives of persons shipwrecked under the precipitous cliffs of a coast where there is no beach. It appears, from the evidence of the naval officers who attended the committee, that the cases to which Mr. Harison's contrivance is adapted are of frequent occurrence, and that many lives have been lost for want of a similar machine. As the apparatus is very portable, and requires but few hands to work it, it is recommended that one be kept at each coast-guard station wherever the nature of the coast points out the probability of its being usefully applied.

New Ice Boat.—A Copenhagen letter states that a Mr. Hjorth, of the Danish artillery, has invented a steam-boat capable of cutting her way through the thickest ice with a rapidity equal to the ordinary rate of sailing. It is to be made of iron, and have engines of 520-horse power.

Quantity of Water in different kinds of Food.—Potatoes contain, it has been ascertained, from 68 to 70 per cent. of water; lentils, 16 per cent.; fresh beef, 72 to 76 per cent.; and brown bread (Schwarzbrod) 31 to 32 per cent. of water.

Production of the Soil.—Mr. John Gedney, of Redenhall, on Tuesday addressed a letter to the *Norwich Mercury*, containing some sanguine opinions on the possibility of increasing the productiveness of the soil, especially in reference to wheat. From an experience of sixteen years, the writer says, "He is convinced that this country ought to be an exporting rather than an importing country, but not until the land is cultivated with profit. Every farmer who does not so cultivate land—that is to say, make the greatest return that the capability of his soil will admit—that although he may say that his land has paid, it must be quite clear to every person that if such capability is not brought into action, a certain loss must be sustained. If double that capital were brought into operation in agriculture the land would be worth more, the tenant richer, the laborer peaceful and happy, and the whole country benefited to a degree delightful to imagine; but landlords must see that as their lands are cultivated tenants must only hire what they can farm with profit. Then, talk of a surplus population, I do not think that we have a sufficiency of laborers, if the land were fully cultivated."

Zoological Society.—A meeting of the above society took place on Tuesday evening, at which William Yarrell, Esq., presided. The secretary announced that the meeting had received from Captain Belcher, of her Majesty's ship Sulphur, at Singapore, a Babydrussa hog, in a remarkably fine and healthy state: the second known to have arrived in England within the last century. Lieut. Smith, of her Majesty's ship Star, forwarded an animal from Vera Cruz, called the cocametzla, a specimen of which has never been previously brought to England. A member exhibited a common domestic mouse, having a most singular appendage to the head, in the form of a large horn or tusk, resembling in shape that of the rhinoceros. About three months ago it was accidentally broken, but it subsequently grew again to its former size. G. B. Sowerby, Esq., described some new species of shells found in the Philippine Islands by H. Cumming, Esq. The meeting then adjourned.

Dr. Willshire's Return from Morocco.—On Thursday week last, Dr. W. H. Willshire unexpectedly returned to London, from his travels in Morocco. We have seen the extensive series of sketches, illustrative of the country and costumes of the natives of this little explored territory, which amount to about sixty. Very many are entirely new, the places not having before been visited by any European possessing the capabilities of delineating them. Ample materials have likewise been collected at the risk of this traveller's personal safety, and also at some considerable outlay, which we doubt not will shortly be published. Dr. W. returned rather sooner than was anticipated, owing to the very unsettled state of affairs in those parts, which, had he not embraced the opportunity, might have detained him longer than might have been pleasant or convenient.

Navigation in Frozen Seas.—In letters from Copenhagen of the 18th Jan., it is stated that M. Claude Martin Bjorth, Secretary of the Royal Artillery, has just removed a difficulty that for more than ten years has vainly exercised the ingenuity of our naval engineers, and which has been many times attempted, but without success. He has invented a steam-boat that can navigate through the thickest ice with a rapidity almost equal to that with which it would proceed without this obstacle. M. Bjorth has sent to the Post-office authorities a model of this steamer, which would be constructed of iron, and would be of 520-horse power. The Post-office, after having submitted it to a committee of mechanics and ship-builders, who made a very favourable report respecting it, have just petitioned the King to grant them permission to construct one of these boats, which is called a "pyroscaphe," which, in winter, would be appropriated to convey the mails through the Great Belt; a strait between Zealand and Funen.

We understand that the publishers of the "Cabinet Cyclopædia" have found it necessary to alter the title-page of that work, in consequence of the unpopularity attached to the name of Dr. Lardner.—*Brighton Gazette.*

Society for promoting Practical Design.—The second anniversary was held on Thursday evening, in the rooms of the institution, at Saville House, Leicester-square, W. Ewart, Esq., M.P., President, in the chair. The report of the Council announced that, although the efficiency of the institution as a school of art had been proved, its progress was not so great as had been anticipated. The principal branches of study were the human figure and the ornamental departments; but there had also been considerable progress in the practice of modelling. The present number of pupils was twenty-five in the senior class and fifteen in the junior, the average nightly attendance being twenty-five, who belonged to painters, carvers, glaziers, cabinet-makers, jewellers, smiths, and other trades. The attendance had at one time been much more numerous; for in February, 1840, there were no fewer than 101 pupils. The progress of the institution had been much retarded from want of funds, in consequence of which a meeting of its patrons was called, when upwards of £45 was received. A discussion ensued upon the mode of management adopted in the school, which it was resolved to refer to a committee composed of the President, W. Hutt, Esq., M.P., and Thomas Wise, Esq, M.P. A communication was made by Mr. Mouchet, as director, recommending the admission of teachers connected with the different normal schools, and stating that between forty and fifty of those belonging to the British and Foreign School Society would be glad to avail themselves of its privileges of instruction, which was referred to a committee.

London University College.—On Wednesday the annual general meeting of the proprietors of the London University College took place in the theatre of that institution, in Gower-street, for the purpose of receiving the report of the council for the past year, and to elect a president, vice-president, treasurer, and six members of the council for the year ensuing. Mr. Atkinson, the secretary, read the report amidst repeated interruptions. It appeared that during the last academical year, 1839-40, the number of pupils in the college classes and schools amounted to 961, consisting of 147 students in the faculty of arts, 423 in the faculty of medicine, and 391 pupils in the junior school. The fees received amounted to £12,070. The number of pupils entered to the hospital was 118, and the amount of fees £2,725 10s. In the medical class the pupils had increased in proportion to one-tenth, and the general classes were above those of last year, whilst the junior school had also augmented. A legacy of £1,000 had been left to the institution by the late H. Longridge, Esq. One of two book-prizes, eleven out of twelve gold medals, and £1,040 out of a sum of £1,280, had been distributed for exhibitions and scholarships of the college. The balance-sheet set forth the general receipts of the year to be £14,359 15s. 4d., and the expenditure £14,106 14s. 4d., leaving a balance in favor of the college of £253 19s.

VARIETIES.

The Cotton Crop of the United States.—The accounts received from the United States by all the recent arrivals concur in representing the crop of cotton as smaller than had been previously calculated upon; the current estimates being from 1,600,000 to 1,650,000 bales, whilst some of the letters reduce the amount as low as 1,300,000 or 1,400,000 bales. It is very difficult to believe that any such falling-off from the produce of 1839 can have taken place; but, from the determination shown to run down the amount of the crop, it is probable enough that some considerable quantity of cotton will be withheld from the market, as happened with respect to the crop of 1838, when the same feeling prevailed. The American planters then estimated the crop at 1,300,000 or 1,400,000 bales; and it appeared from the receipts at the ports to be really 1,360,000; but it is now agreed on all hands, that the enormous produce of 1839 was swelled by about 150,000 bales of the cotton of the preceding year, which had been kept back from the ports, whereby a crop of really more than 1,500,000 bales had been apparently diminished to 1,360,000.—*Manchester Guardian.*

Application of the Wreck of the Royal George to Railways.—A large portion of timber recovered from the Royal George at Spithead has recently found its way into Wales, in the shape of sleepers for the Taaff Vale railway. Thus the oak, originally appropriated by the shipwright to form the tough ribs of a British man-of-war, first bore the heroes of Britain triumphantly through the battle and the tempest, in the most majestic of floating citadels. The same timber was next doomed to slumber at the bottom of the ocean for half a century—forgotten by most, and remembered by others only as gone for ever from human ken. This well-brined oak was, nevertheless, destined again to see the upper world; and now many of its fragments are lying across the mountains of Cwm Taaff, and sustaining the iron road, along which a large portion of the manufactures and commerce of Glamorganshire will travel to and from the element they so long occupied.—*Carnarvon Herald.*

Accident by Machinery.—An inquest was held on Saturday on the body of a boy aged 13, who died in consequence of wounds received the preceding Tuesday by getting entangled in the works of a machine used for planing. The engine was reversed, and the boy extricated, but not until the injury he received was so severe as to render his recovery hopeless. Verdict "Accidental Death."

New Lighthouse at Plymouth.—The ceremony of laying the foundation stone of the lighthouse intended to be built on the west end of the Plymouth breakwater, took place on Monday morning last. The weather was delightfully serene, which added much to the interest of the occasion. The stone having been prepared it was lowered into its place, and Rear Admiral Warren, Admiral Superintendent of the dockyard, having plumbed it, spread the mortar, and several coins of the realm were deposited beneath the stone.

Birth of a Dromedary.—A female dromedary was born at the Zoological Gardens in the Regent's Park on Tuesday, and is likely to do well. This is the second time that there has been a successful birth of this animal in this managerie.

The Steamer India.—From private letters received from the Cape of Good Hope, bearing date the 8th of December last, it would appear that this remarkably fine vessel, which was built expressly for the purpose of conveying packets and passengers to and fro between this country and India, has suffered very considerably on her voyage out. After leaving Cape St. Vincent they experienced most tempestuous weather, and on the 20th of November the steamer was in imminent peril, her rigging was nearly all carried away, and the sea had swept her decks clean. On the 24th of November she arrived at the Cape of Good Hope, where she remained until the 30th of that month, when she pursued her destination, which was Calcutta.

Import Duties.—A number of resolutions relative to the report on import duties were passed at a late meeting of the Glasgow Chamber of Commerce and Manufactures. These were to the effect, that although the present system of import duties might be simplified with great advantage, it was necessary to observe much caution in modifying or repealing duties affecting such branches of commerce or manufacture as have long enjoyed special protection. The idea was, that evidence as yet afforded on the subject was partial and incomplete; indeed so much so, as to render it expedient to resume the inquiry; and while the propriety of regulating the tariff, so as to produce the highest revenue from the lowest duty, was admitted, it was considered expedient to maintain differential duties in favor of British manufactures, domestic and colonial agriculture, and fisheries. As for the tropical colonies, it is observed that the peculiar circumstances in which they have been placed by recent social changes render any alteration of duties, by which their productions would be affected, inexpedient at the present time, while it is also desirable that all restrictions upon their trade and intercourse, both with foreign nations and among themselves, be removed.

Steam Navigation in the Pacific.—The following extract of a letter, dated November 23d, 1840, shows the lively interest taken in that part of the world in the scheme for establishing steam navigation between the ports in the Pacific Ocean. "It is beyond your conception the sensation produced by the actual arrival of the Peru on the 5th of December. From the day the vessel arrived until that of her sailing again on her return trip to Valparaiso, from 3,000 to 4,000 persons must have gone on board her daily. The road to the port of Callao from this city (six miles) was crowded from morning to night with people going to and returning from 'el vapor' (the steamer). Nothing but 'el buque del vapor' (the vapor ship) has been talked of for days. Nor is it to be wondered at, as the Peru is the first steamer the inhabitants had ever seen. The day she sailed from the port, I should think there were at least 5,000 persons from Lima to see her start, of all classes and colors; not a vehicle, horse, mule, or donkey, or any other manner by which the curious of Lima could be conveyed to Callao, but what was made use of, and thousands of individuals who were not fortunate enough to have their bodies transported to Callao, were to be seen on the tops of the houses of this city to behold the wonder. The Peru sailed from Callao with not under 120 passengers, producing to the coffers of the company about 4,550 dollars: not a bad beginning."

The half-yearly meeting of the proprietors of the General Steam Navigation Company was held on Tuesday, at the office in Lombard-street. From the report of the directors it was collected that the operations of the past year had been attended with success, and that the affairs generally were in a course of prosperous advancement Full explanations were entered into upon various points interesting to the proprietors, and appeared to afford much satisfaction. It was resolved, that a considerable sum should be appropriated toward the cost of two large steam ships of 650 and 900 tons, now building by Messrs. Green, Wigram, and Green, and the customary dividend and bonus were declared.

Newspapers.—De Tocqueville, in his work on America, gives this forcible sketch:—"A newspaper can drop the same thought into a thousand minds at the same moment. A newspaper is an adviser who does not require to be sought, but who comes to you of his own accord, and talks to you briefly every day of common weal, without distracting your private affairs. Newspapers, therefore, become more necessary in proportion as men become more equal, and individuals more to be feared. To suppose that they only serve to protect freedom would be to diminish their importance; they maintain civilisation."

Cultivation of Tobacco in Canada.—In passing through the province of Upper Canada, from Detroit to Buffalo, within the last week, we were not a little surprised to see so much of this plant grown north of Lake Erie. It is almost the only crop made by the cultivators of the soil, for the distance of 75 miles east from Malden, along the shore of the lake. We saw many drying houses or barns 100 feet in length, and nearly filled with the poisonous weed hung up to cure. The runaway slaves and free blacks from Virginia, Kentucky, and elsewhere, have carried with them a practical knowledge of cultivating tobacco to their new residence, and in despite of its inappropriate latitude, they are able to turn it to a good account. There are a large number of African families cultivating their own farms in the upper province; they are not a whit behind their white neighbours in producing for themselves a liberal share of the comforts of civilised life. We have recently passed through the southern portion of Indiana and Illinois, among the emigrants from the slave states south of the Ohio river, and in truth we must say that they are not as well sheltered, and we doubt if better fed, than the African emigrants settled between Niagara and Detroit rivers.—*Buffalo Commercial Advertiser.*

ADVERTISEMENTS.

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THE

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AND JOURNAL OF INDUSTRY;

A WEEKLY BRITISH AND FOREIGN MISCELLANY OF SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

FIAT JUSTITIA RUAT CŒLUM

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THE EFFECTS OF PERCUSSION.

There appears to exist very unsettled views respecting the causes of the powerful effects of percussive force, even among persons who are generally conversant with the laws of mechanical science. We endeavored, in a preceding article, to explain the causes which give additional efficacy to power suddenly brought into action; and we now propose to pursue the inquiry, with the view of showing more fully the principle on which this peculiar action depends.

The common error into which most persons fall when they perceive the destructive effects of a blow, or of an explosion, is, that the force exerted in this manner is much greater than when the power is employed in communicating gradual motion, or in pressing against other bodies. The sudden blow of a hammer will break a stone, or drive in a nail, which it would be impossible to accomplish by the same amount of strength employed in pushing against either. It is natural, therefore, to conceive that the force exerted in the one case is greater than in the other; but this inference is founded on an erroneous view of the nature of the effects produced.

There is no more fruitful source of error in mechaical science than that of measuring the amount of any force by the effects it in all cases produces. This error is the more to be guarded against, because this mode of estimating the amount of force exerted seems, on first consideration, to be the most natural and reasonable means of determining the question. We have, however, mentioned on previous occasions, that the most animated disputes among philosophers of the last century all turned upon this erroneous mode of estimating forces, and gave rise to the most contradictory opinions, which continue to prevail to a great extent, and to perplex and obscure some of the simplest laws of motion. It was contended, for instance, by one class of philosophers, that as a double velocity caused a ball or an arrow to penetrate four times the depth into a yielding mass, that it must necessarily require a quadruple force to produce that quadruple effect. Thus, contrary to the fact in other cases established, it was contended that a quadruple power was requisite to communicate double velocity. These difficulties would never have arisen, or would have been readily solved, if the capacity of the resisting bodies had been considered; it would then have been found, that the power to resist varies according to the velocity of the acting body; that a given amount of resistance is presented in a given time; and that as the velocity increases, therefore the resistance diminishes.

It is this varying power of resistance, in reference to time, that occasions the great effects of percussion. The percussive force is not greater than when the power is gradually brought to bear on the resisting object; but the capacity of the latter to resist the sudden action is diminished. When, for instance, a blow is struck with a hammer, the strength of the arm exerted during the blow is all concentrated within one instant of time; and the body struck, which would have had resisting force sufficient to withstand the same power if communicated gradually, cannot resist the force when thus concentrated. These variations in resistance, in proportion to the velocity of the acting forces, are continually presenting themselves in the daily occurrences of life. We find that a piece of string will resist a strong heavy pull, yet readily snap asunder by a smaller force rapidly applied; an effectual resistance is also offered in numerous instauces to a steady effort, that may be instantly overcome by a sudden impulse. The effect of a blow, contrasted with a continued pressure, affords, however, the most apt illustration of this power of sudden action to overcome resistances. In all these cases there is no additional power acquired by its accumulation, or by the sudden impulse. There is, in short, no force gained, as is erroneously supposed, by percussion. Its effect is merely to concentrate the same amount of force, and bring it to bear in a manner best adapted to overcome resistance. It is the resistance which in such cases is less, and not the power that is greater.

The cause of the resistance diminishing is readily understood on the principle we have endeavored to establish, that the action of all attractive forces is regulated by time. The attraction of cohesion, for instance, which holds the particles of substances together, may be assumed to act in different bodies with an energy which, like the attraction of gravitation, has reference to time. The latter attractive force, it is known, exerts a power sufficient to attract a body to the earth at the rate of sixteen feet in a second. Whether gravitation operate in attracting a falling body to the earth, or in keeping it there after it has fallen, in either case the attraction has the same reference to time. If the force of gravitation were doubled, it would be manifested by a doubled velocity given to bodies when falling, as well as by a two-fold increase of their weight. And again, if any given weight be not permitted to remain sufficiently long on one spot to afford time for the full development of the effect of gravitation, it will press on that spot with only a portion of its weight. In the same manner, if by any sudden blow a body be propelled upwards against gravitation, the amount of that force in drawing the body down will be in proportion to the length of time it operates; consequently, a body propelled with double velocity will, in rising double the height, experience only the same amount of gravitating resisting power.

The same principle is applicable to cohesive attraction. When the force tending to separate the particles of matter acts with great velocity, it exceeds the energy or activity of the cohesive attraction which binds them together, and a fracture is the consequence. In other words, the velocity of the acting force is greater than the velocity of the attracting power; and the particles are thus removed beyond the spheres of their reciprocal attractions. A rapid application of the same force which if gradually exerted would have produced no effect, thus breaks the substance to pieces, because the resistance which the substance acted on presents is determined by the time of its acting attractions.

We thus perceive, that the effects of percussion depend entirely on the circumstances of the bodies acted on, and not in any gain of acting power. It depends on the same principle which we have endeavored on other occasions to enforce, that the power of resistance and amount of pressure are determined by the time of action, in the same manner as the momentum of a moving body is determined by its velocity.

MINERAL RICHES OF BELGIUM.

We translate from *Le Fanal*, Brussels paper, the following account of the mineral treasures of Belgium; a great part of which have hitherto not been explored, owing to the want of internal communication. The extension of the railways, especially of that between the Sambre and the Meuse, and the diminution of the river dues, wil', it is ex-

pected, be the means of opening a profitable market for these neglected sources of national wealth. It will be perceived, that one of the objects which the writer in the Brussels journal fondly hopes will be achieved by facilitating the working of the Belgian mineral resources, is the much-dwelt-upon competition with England. We, however, have no fears of foreign competition in these matters, being fully persuaded that, with proper encouragement, our manufactures will continue to improve, and be able to maintain the leading position which they have attained under so many difficulties. The *Fanal*, in enumerating the mineral riches of Belgium, passes over the beds of coal in the kingdom, as all the world is supposed to know that it contains large stores of that valuable product. The writer continues:—

"But few persons, even in our country, know the rich mines of iron, lead, zinc, the immense quarries of marbles of all kinds, slates, and even stores of compost, that Belgium possesses. We will divide our description of the mineral wealth into provinces. That of Hainault, where we reside, will be more particularly noticed.

"The geognostic description of Hainault is simple and easy. In the north, to the Sambre, this province presents a continued plain, the undulations in which are produced solely by the courses of the rivers, and are generally scarcely perceptible. Here the surface is composed of sandy or alluvial beds that the waters have deposited. At the valley of the Sambre the aspect of the country changes; the surface becomes more varied; the valleys are more numerous, and the sides of the hills more steep; the rocks present on all sides their denuded strata, their inclinations sometimes disrupted, but obeying generally a uniform order. In the environs of Mons, and even near to Charleroi, the coal strata are covered with beds of chalk or sand, but at those points the strata crop out, and discover their riches to the cultivator of the soil. In pursuing the course of the Sambre, which appears to pass over a tract of land almost identical in one part of its course, we come soon to the old sandstone formation on which the coal seems to rest. One fact, that every one must remark, is that this land appears more suitable to the growth of trees than to annual culture, whether it be that the soil absorbs the water too readily, or whether it is naturally arid, the sandstone offers great difficulty to the farmer. The miner sometimes finds in this place hidden riches under the form of hydrate of iron, but this does not often occur.

"The calcareous earth which immediately succeeds, is much richer. It can be cultivated, but it requires care and particular manures, without which it is cold and unproductive; but it contains in abundance all the minerals that constitute the power, the riches, and happiness of a people, who know how to profit by them, viz., iron, copper, lead, zinc, silver, marbles, plastic clay, &c. In the province of Hainault this mineral formation forms a large and very extended band. In some parts it touches on the coal beds; in others it is separated from them by the band of red sandstone. Its average breadth is from ten to twelve leagues, and it terminates on the schistous strata beyond Couvin.

"Only those iron ores near the surface of this calcareous district have been hitherto worked. The deficiency of easy internal communication, by making these imperfect products an exorbitant price, have prevented also the working of the richer veins which lie deeper under the surface.

"The valley of Heure traverses these strata at their greatest breadth. The access to the richer veins of iron ore would greatly increase the produce of the blast furnaces, by improving the quality and diminishing the price of iron; and if to that advantage be added the means of conveyance at a moderate cost, there is no doubt we should be able easily to compete with the English in all the markets of Europe and in America. The strata of calcareous earth contain also numerous veins of oxide or carbonate of lead. Many very rich ores exist in the neighbourhood of Philippeville. Hitherto they have not been explored otherwise than by idle peasants, who sell the produce in loads to some founders in the province of Luxemburgh. Sometimes they reduce the metal themselves, in small excavations formed in the ground, and by means of a pair of blacksmith's bellows. These indications serve to show the value of the discoveries that would be made if the country were sufficiently accessible to encourage able and active miners to pursue their researches there.

"We will not now particularise the other mineral products which are often found in the transition rocks between the limestone and schists; but we must not omit the numerous and valuable beds of slate in the midst of the provinces of Hainault and Namur. These stores of wealth, which would be very valuable if there were an easy means of conveyance, are at present without value, because they cannot be conveyed along the Meuse, excepting on payment of dues that are altogether prohibitive. The proposed railway between the Sambre and the Meuse would be eminently adapted to bring these valuable products into demand.

We have not yet spoken of the immense forests which cover the surfaces of a great part of the provinces of Hainault and Namur. These forests commence in ascending the valley of the river d'Heure, two leagues from Marchiennes au-Pont, and continue almost without interruption to the French frontier, near Rocroy."

NATIONAL ADVANTAGES OF RAILROADS TO BELGIUM.

In a recent setting of the Chamber of Representatives at Brussels, Mr. Lys, representative of Verviers, made the following observations on the great natural advantages which Belgium has derived from the establishment of the system of railways, which is an honour to the enterprise of that kingdom.

"Manufactures and commerce, M. Lys said, are the only means open to Belgium by which she can gain an influential position among civilised nations; for considered with respect to foreign politics the limited extent of our country places us in the rank of secondary powers; it is, then, necessary to endeavor to gain in manufacturing and commercial importance, that in which we are deficient in substantial power. Great works of general interest are eminently adapted to attain this object. Belgium, proceeding in the first rank of progressive nations, will become strong from the moral influence she will acquire, in connecting her nationality with the most important interests of civilisation; and on this subject we ought to pay a just tribute of gratitude to the Minister of Public Works. It was he who first thoroughly understood the relative position of Belgium with respect to other nations. The revolution had spread alarm among our neighbors. Belgium was considered as a volcano which could only occasion destruction, and was unable to produce any important work; but, thanks to M. Rogier, they were soon compelled to change their opinion. Is it not, indeed, a grand and noble spectacle, to behold a country so recently constituted into a nation, proving herself worthy of the baptism of independence, by immediately commencing the execution of gigantic works; works of which continental Europe furnishes us no example! Thus, foreign nations have held Belgium in high estimation; their statesmen have been compelled to send persons expressly appointed to study our system of railroads.

"Our system of railroads has changed the unfavorable opinion that was entertained by the people of different nations against Belgium, an opinion that was perhaps supported by their governments. Thanks then to the minister who first conceived the idea of this great undertaking; let us hasten to say, he has deserved the gratitude of his country.

"Communication by railroads is an invention eminently national, which has conciliated for Belgium the esteem of neighbouring nations; but besides this result, already so productive of desirable consequences, the railroads constitute a good speculation in a financial point of view. In fact the Belgian railroads already produce nearly 4 per cent. of the sums expended on their construction, and they are not yet connected either with Germany or France. Judging from this result we may be allowed to hope that the Belgian railroads will be the source of a revenue that will daily increase.

"Even at the present time the expenses of the railroad are covered, not taking into consideration the advantages that it otherwise occasions. The expense is entirely in favor of the country; for the workmen are Belgians, and the materials are of Belgian produce. Thus the railroad is an immense chain of communication which unites a great number of towns, that are thenceforth favorable to Belgium and her manufactures, without its being any expense to the nation; for it is clearly proved that the product exceeds the extent of the capital employed, and in so advantageous a manner that the whole expense may be said to consist of merely transposing the funds, which, taken from the coffers of the state, are advantageously dispensed to the inhabitants of the whole country.

"It remains for the Minister of Public Works to bring his undertaking to perfection, and in order to accomplish this he should now endeavor to render the working of the railroad as productive as possible. This is a necessary completion of his labors.

"The manner in which the railway is worked is much too expensive; and it is at the time, when these public expenses have arrived at so large a sum, that it ought to be the duty of the national representation to take advantage of every opportunity that may occur to lessen as much possible the burden which oppresses the country.

"A source of excessive and at the same time useless expense consists in the financial regulations of the railroad. The railroad has an administration for the receipts wholly independent of the financial administration.

"The manager of the department of the public works thus becomes director of part of the finances of the kingdom, and it will be generally admitted that this is a departure from the system of unity required in the administration of the funds. Let this department have under its control everything relating to the construction, the repairing, and the working, and it will then be confined within the limits that order assigns to a good administration. Hence it will result that everything of financial importance ought to be restricted to the department of finances, and should be subject to the usual rules which regulate this important branch of the government."

CORNISH STEAM-ENGINES.

A correspondent of the *Mining Journal* gives the following account of the origin and nature of the improvements in steam-engines in Cornwall, which have given such a decided preference, in point of work, to the kind of engines there employed:—

"To those who are unacquainted with the causes which gave rise to the great superiority of these engines, it will very naturally be asked, how did it originate? By what modes, and by whom has it been accomplished? To this I would answer, that the great necessity of economy of fuel, in consequence of its being so expensive—the great depth and poverty of the mines—and I have no hesitation in saying, that the monthly report of the performance of steam-engines has, above all, been the chief cause of the improvements, because, by making the duty of the engines (which are managed by the different engineers) public, it excites a spirit of emulation in each, that his engines should exceed in duty those of his competitors. Amongst the most eminent of our Cornish engineers who have

left behind them lasting monuments of their improvements, we find the names of Trevithick and Woolf—the former for his improvements in steam-boilers or generators, which are now the only sort in use in Cornwall—and the latter in carrying out the great principle of the expansion of steam, which is now found to be of such immense benefit. The highest duty obtained by Mr. Watt did not exceed 28,000,000 lbs., lifted one foot high by the consumption of one bushel of coals; since which time engines of the same class have exceeded 60,000,000 lbs., and which have been accomplished by the improvements above alluded to, aided by better workmanship, and clothing the engines more extensively with proper non-conductors, in order to prevent the radiation of heat. This great improvement in duty was almost wholly confined to pumping-engines, until 1835, when Mr. Sims erected a rotary engine of 9-foot stroke, working expansively, on Charlestown United Mines, for stamping tin ores, which realised his most sanguine expectations, and which at once gave to the country a cheap process for pulverising tin and copper ore. The saving will be found by a reference to the monthly reports for 1834 and 1840, where it will be found that the average duty of stamping engines for 1834—the year previous to the improved engine being erected—was 20,000,000 lbs. only; and the average duty of all the engines, on the new construction, for 1840, was 50,000,000 lbs.

"The successful effect of this mode of expansion induced Mr. Sims to carry his attempts to improve on the principle still further; therefore, having, by a series of experiments, proved, that in every engine working expansively, with a proper load, there was, at the extent of every down-stroke of piston, a cylinder full of steam, of a pressure equivalent to the load the engine had to lift, he turned his attention to the best mode of making that steam available for the further benefit of the engine. In this he has also been eminently successful. The Messrs. Lyle having a 50-inch second-hand pumping-engine to errect on the Carn Brea Mines, he solicited the favor of their allowing him to try his experiment. These very liberal gentlemen at once acceded to his request, and the result has amply paid for their liberality. It will be remarked, that the size of the engine, viz., 50-inch cylinder, is below the first class, and is what is generally termed the middle-class, the average duty of which is about 50,000,000, when working under favorable circumstances; in fact, the average duty of the best engine of this size was, for 1840, 41,000,000. The duty of the improved engine at the Carn Brea Mines, for the last month, was 83,000,000; showing a difference of 32,000,000; and which duty is on the increase in proportion to the increase of work the engine has to do. It will be observed that this improvement has not arisen from having a new engine of superior manufacture, as it is merely an old engine cobbled together to try the experiment; a new engine, and of first class, would show a duty very superior. The great increase of duty of this engine is not the only improvement, as it becomes more powerful in proportion to its increased duty. The benefit arising from this fact is of paramount importance; as, for instance, many mines have been suspended in consequence of the steam power not being sufficient to pump out the water to a greater depth, and the finances of the adventurers being too low to erect an engine of a greater power; whereas, in the improved plan, they could for a little expense, and in one week, improve the power and the duty also full 40 per cent. Mr. Sims says that so effectually has he proved the great benefit of the improvement, that he can guarantee its doing its work well for all purposes, *i. e.*, for rotary engines of all descriptions, as well as pumping-engines."

NEW FLEET OF STEAM FRIGATES.

(*From the Greenock Advertiser.*)

The first of the steam frigates now being constructed under contract with her Majesty's Government for the Royal West India Mail Steam Packet Company, was launched from the building-yard of Messrs. R. Duncan and Co., of this place, on Thusday last, at two o'clock. As the precursor of a more gigantic system of intercolonial steam navigation than has ever before been seen, the success of this vessel has been looked forward to with much more anxiety than any other launch that has taken place for a long time. Although her size is much greater than that of any other ship ever constructed in this part of the world, yet the correct judgment which has presided over her proportions, and the fine taste for which her builders are so justly famed, have left no appearance either of clumsiness or unwieldiness about her shape, which is as graceful and elegant as that of the smallest clipper on the river. At the appointed hour, she slid gently along the ways, and, descending slowly and gracefully, took her place on the waters. She was appropriately named the "Clyde," and gives every promise of sustaining the high character of the builders and engineers of that river whose name she bears. The Clyde is the first of the fourteen frigates of equal dimensions now in progress of construction for the Royal Mail Steam Packet Company. They are all designed to perform, in time of peace, the service of mail packets to and among the West India Islands, and fully armed with the heaviest ordnance, to act as war frigates when required by Government for that purpose. Thus the country will be doubly served; and while it pays to the Mail Company £240,000 per annum for the transport of mails, it will defray, by the same payment, the annual charges of the largest and most powerful steam fleet in the world. These vessels are all of similar dimensions, having a capacity of about 1,500 tons each, with steam-engines of about 500 horse power. The aggregate fleet will thus consist of 21,000 tons, and 7,000 horses power. The soundness of the plans which the West India Directors have followed, may be judged by this, that their vessels are almost exactly of the proportions of the Great Western, and of the shape and construction of the Halifax ships, with this difference only, they are larger than the Great Western or Halifax vessels, and have a greater proportioned breadth of beam to enable them to carry their armament of heavy guns on deck, while they have also a roomy spar deck for giving the air and accommodation so desirable in a warm climate. Neither in their ships nor their engines do this company appear to have been led into the experiment of any new and idle schemes or dangerous novelties. They have adopted the plain old lever engines, and ordinary boilers, as constructed by the most experienced engineers. In what we have said of the construction of the ships, we will be understood as speaking only of those few which we have seen; but we take it for granted that, in all the great points of construction, they are similar to each other. It is well known that different builders and different districts of the country have different modes of construction: thus the Clyde, which has just been launched by Mr. Duncan, may be supposed to resemble most the Britannia Halifax ship, of which he was the builder; while the ships building by Mr. Paterson at Bristol may be supposed to resemble more the Great Western, of which he was the constructor; and the ships building on the Thames may be conceived to partake of the construction of the Sesostris, which was the chef d'œuvre of Mr. Pitcher. These varieties, while they will not interfere with the efficiency and uniformity of the fleet, will give the means of determining many important points in naval construction, and will enable comparative trials to be made with an accuracy never before attained. Thus, four of these ships, which are being constructed in our own harbours, under the direction of Mr. Scott Russell, of Messrs. Caird and Co., are all to have engines so perfectly identical with each other, that every part of one engine will fit with accuracy any of the four pairs of engines; and as these are to be placed in ships built severally by Messrs Duncan, Wood, and Thompson, any slight peculiarities in the forms of these four vessels will be most accurately tested; and as these four ships are formed upon the principles so much approved of upon the Clyde, while the others are constructed more on the English plans, the value of the two systems will be conclusively ascertained. Besides these four ships, there are two others being built on the Clyde, by Mr. Scott and Mr. MacMillan, with engines of Messrs. Scott, Sinclair and Co.; one at Leith, by Mr. Menzies, and one at Cowes, by Mr. White, to receive engines from Mr. Bury, of Liverpool; four building by Mr. Pitcher, of North Fleet, on the Thames, are to have engines by Messrs. Maudsley and Messrs. Miller; and two building by Mr. Paterson, at Bristol, are to have engines by Messrs. Acramans, of that port. Thus the merits of the most eminent steam-ship contractors are placed in the closest competition, and, in their mutual rivalry, the Mail Company possesses a sure guarantee for the excellence of their fleet.

COPYRIGHT IN DESIGNS.

Mr. Grenville Withers, a machinist and engineer, who has been summoned to give evidence before the committee of the House of Commons on the exportation of machinery, has addressed a letter to Mr. Mark Philips, on the subject of Copyright in Designs, which appears to embody in a clear and forcible manner all the arguments that can be urged against the extension to printed cottons of the same protection for new patterns which is already granted to patterns in woollen and other fabrics, and to manufactured articles. Our opinions on the justice and expediency of such extension we have already stated, and they remain unchanged; but at the same time it is but fair play to lay before our readers the arguments on the other side of the question. We therefore extract a great portion of Mr. Withers's letter, which takes a practical view of the subject, and considers it in an impartial spirit. It will be observed, however, that Mr. Withers's opinions are founded on the supposition that little or no advantage can be gained by improvements in the present designs; that the trade is already at its highest state of perfection, and that it would be best to let well alone. In this view of the question he entirely overlooks the fact that foreign manufacturers are daily making improvements, and that it is impossible for the manufacturers of this country to remain inert if they desire to maintain their present eminence. The question is, whether a greater protection would not be the means of producing greater perfection and elegance in the manufacture. We do not apprehend any enhanced price on the goods calculated to lessen the demand; for, supposing an additional charge were made on the fabrics with elaborate and highly finished designs, as a necessary recompense to the designer, this would not prevent the manufacture of the cheaper articles, which now possess the command of the foreign markets. With these remarks we leave Mr. Withers to state his views of the subject:—

"My profession as a machinist and engineer has given me daily opportunities of knowing the true state of manufactures abroad, and of calculating with very great accuracy the advantages and disadvantages which facilitate or impede their development there, compared with similar branches of industry in England. The result in my mind most clearly and decidedly established is, that in no country in Europe can cotton printed cloths be manufactured so cheaply as in England.

"If I am right in this assertion, and I am prepared to prove it, it follows that the English manufacturer is favored by some peculiar advantages

and that so long as they are continued to him he has nothing to fear from competition in a third market, where he is admitted on equal terms with his competitors, that is, so far as regards price, and the amount of our exports of low and middle qualities of goods proves that price is the chief consideration with the great mass of consumers.

"In richness of coloring and tastefulness of design displayed in the finest qualities of goods, it is still the fashion to say that the French excel us. This may be true,—it is probably false, and certainly it is charged with a great deal of prejudice; it is a foolish admission on our parts, because it can be true only to a limited extent. We have injured our own reputation in this way so much, that a real superiority on our part would take years to establish. However, the consumption of such articles is in all countries extremely confined, compared with the others; and if it must be admitted that we are behind our neighbours in the application of light fanciful patterns, it is also acknowledged that the inferiority is visible to connoisseurs only, and that it is hourly becoming less perceptible to the most interested critics.

"Under the plea and with the laudable intention of improving our taste in original design and effect of coloring, we hazard sacrificing a great and positive good to a lesser and uncertain one. We are in possession of the trade in which nine-tenths of the consumption exists, nor are we entirely without our share in the remaining tenth: it would certainly be very pleasing to have the trade of the whole world to ourselves, but let us beware, lest in grasping too far we miss our footing.

"Any legislative measure which should in its operation have a tendency to increase or raise the selling price of cotton prints would do incalculable injury to the whole of the cotton manufacturers, inasmuch as it would deprive the print trade of its sole recommendation in the estimation of the consumer, with whom price is everything.

"Now all copyrights, being monopolies, have this tendency in proportion to their duration. A man who has a right which expires in three months makes haste to secure all the advantages which it offers; to do this he must be active in his affairs, and reasonable in his demands; he must bring his goods early into the market, and dispose of them on fair and reasonable terms. Here the present law acts as a stimulus to extra exertion and cheap production—absolute conditions of extensive and profitable trade.

"So short a period allowed for proprietorship has an obvious advantage as regards the general interests of the trade, and tends most clearly to those improvements which are sought after. The choice of beautiful coloring and originality of design becomes an obligation, and the sole condition of profit. It is a paramount reason for accepting none but such as promise by their superior excellence to obtain rapid success; and the monopoly of a successful pattern for three months in the hands of an active and respectable man is infinitely greater as a reward than any fourteen years' patent granted for an invention, which has most probably cost years of watching and intense thought, as well as thousands of pounds spent in arduous and repeated experiments.

"If copyrights were extended to twelve months, it is very certain there would be less necessity for a severe choice of pattern, and for exertion in bringing it out; such a law would create a monopoly to enrich a few at the expense of the consumer. Prices of favored patterns would rise, and the consumption would diminish in proportion; foreign competition would be encouraged, and a portion of our export trade would be given to our rivals.

"These would be the unavoidable consequences of an extension of the copyright from three to twelve months, a period preposterously long for such ephemeral kaleidescope inventions, of which not one in fifty thousand has any claim to originality or real merit. Most of them are artfully disguised piracies, and the very best of them amply paid for by a three months' privilege to exclusive possession.

"It is a dangerous thing at the present time to make doubtful experiments, when such large interests are at stake, and where one false step may involve us in unknown difficulties: foreign competition is always on the *qui vive*, and ready to take advantage of any act of folly or ignorance into which we may be betrayed.

"Cotton printed goods were never manufactured so cheaply or got up in such rare perfection as they are at present. If we are shut out of several continental markets, it is not because we offer a dear or an inferior article; much less is it the fault of the law which limits the duration of copyrights to three calendar months. The fault is in the high protecting duties laid on by other governments, purposely to exclude ruinous competition. Those are barriers which we cannot force by any laws, and less than all by a law to legalise a monstrous monopoly, when experience and common sense show us that we have need of our unshackled energies to cope with the difficulties thrown in our way by other countries.

"We have gone on improving under the law as it now stands; what more could we do under a new one, supposing it to operate well? But there is a chance, a probability, that it would not work well, and then what would be the consequences?

"It might, indeed I know it would, benefit some manufacturers and merchants—at the expense, be it understood, of the consumer; but that, I imagine, ought not to be a reason for granting the changes asked for.

"The piracy of another man's designs deserves the severest reprobation; but however galling it may be to see one's self robbed, the plea is inadmissible when urged as a reason for extending the duration of copyrights of designs, or for altering the present law at all. Besides, where is the designer who does not pirate from others? It is impossible to avoid it, whatever may be the genius for original invention."

In addition to this statement of the arguments by Mr. Withers, the calico printers as a body have petitioned Parliament against the bill for extending the copyright in designs. Their statement is of course tinctured by interested motives. They make in many instances the same objections as those raised by Mr. Withers. The following are some of the reasons they adduce against the bill:—

"Because legislation should be 'for the many, and not for the few,' and the trade in prints, which is most important and extensive with respect to both home consumption and export, is that of the medium class garment prints, which are worn principally by the middle and working classes, and the essential recommendation of which is cheapness:—

"It is computed that not less than 520,000 designs for prints are produced annually in and near Manchester.

"Because extended copyright, under the plea of advancing the art of design, will confer an artificial value upon designs for medium prints, and will embarrass and depress the trade at home, and so extend and improve that of the continent:

"Because it will also incite a litigation in a trade which, from the difficulty of deciding what is or is not a new and original pattern, may be said to be peculiarly liable to the evils of litigation if the inducement thereto be once held out.

"Because extended copyright will offer a direct bounty to the foreigner to produce prohibited prints, and it is unjust and unwise to place a restraint upon the English printer, when no corresponding restraint can be placed upon his continental rival:

"Because the English printer is threatened with a serious competition from the continents both of Europe and America, where already the copying of English patterns prevails to a great extent, and the proposed law will foster that system of copying so as to render the most profitable trade to the foreigner, in the same manner as by prohibiting the export of certain classes of machinery from this country, and allowing the export of tools and other classes of machinery, the continental machinists have become almost exclusively manufacturers of the prohibited machines, and very subordinately of those which are permitted to be obtained from this country:

"Because, if there must be experiments in commercial legislation, it is submitted that the trial ought not to be made upon a trade confessedly so extensive and flourishing as calico printing, but upon some branch of industry in which, if the experiments fail, the injury may be repaired:

"Because the details of the proposed measure are mischievous and most oppressive, perpetuating the monstrous evils of the process by injunction and actions at law (as to the former of which see the evidence of J. H. Koe, Esq., the Chancery barrister), instead of providing a cheap and accessible tribunal for the adjustment of differences, such as that about to be created under the Local Courts Bill, and erecting a close registry, wherein by the mere act of depositing a pattern, without any proof that such pattern is new or original, and in fact without any title whatever, a party may obtain a copyright for 12 months, and may institute proceedings against all persons—whether printers, merchants, or shopkeepers — invading (although in ignorance) his so-called right; and if such proceedings be taken, instead of the claimant of copyright being called upon to prove his title to exclusive privilege, the defendant is to be required to prove that the pattern is not an original —a proof which, under the most favorable circumstances, would be difficult, and in many cases impossible."

BRITISH PATENTS.

PATENT NOT SPECIFIED LAST WEEK WHEN DUE.

HENRY WATERTON, Esq., of Fulmer-place, Gerard's-cross, Buckingham, *improvements in the manufacture of sal ammoniac*, due Feb. 27.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 133.)

CHARLES SMITH of Exeter, Devon, builder, for *improvements in the manufacture of lime and cement, or composition*, Feb 27.—Claim first.—The mode of calcining lime or cement, or composition, by means of kilns, so formed, that the charge in the upper part shall be calcining, whilst the lower part of the charge is cooling; and in cooling, the heat therefrom passes to the upper part of the kiln.

The heat from coke ovens, furnaces, &c., is admitted into the kiln by flues which enter the kiln half its height from the ground, and the heat rising upwards calcines the upper part of the charge; whilst the lower part of the charge which has been calcined, is cooling, the heat arising from it assists in the calcination of the upper part. The lower part of the charge as it cools is raked out at the bottom of the kiln, and the upper part descending, fresh lime is added at the top of the kiln.

Claim second.—The mode of calcining lime and cements in retorts or ovens when in connection with a closed chamber, where the matters can be cooled before being brought into the atmosphere, and also the carrying off the gases or vapours, so as to apply them to a variety of useful purposes.

The lime and cements are calcined in ovens which communicate with a closed chamber, in which the lime and cements, after being calcined, are cooled before they are brought into the atmosphere. The gases or vapors are carried off from the ovens by pipes provided with stop-cocks, into suitable vessels provided for receiving them.

Claim third.—The application of the heat of lime-kilns to the purposes of evaporating fluids in suitable boilers or pans, as herein described.

The heat arising from the kiln is applied by

means of flues to the heating of boilers or pans for evaporating fluids.

Claim fourth.—The mode of slacking lime in chambers with carbonic acid as herein described.

The lime is slacked in a chamber, into which the carbonic acid arising from the kiln is admitted by means of valves communicating with the flue.

Claim fifth.—The mode of manufacturing lime by re-calcining it after dry slacking.

The lime after being slacked as above described, is placed in the oven and again calcined.

Claim sixth.—The mode of manufacturing lime by partially calcining lime-stone in a kiln in order to convert it into sub-carbonate, and after cooling and grinding again to calcine it, whether separate, or combined with other matters, for making cement.

This claim fully describes itself.

Claim seventh.—The mode of making cement by saturating sulphate of lime with ammoniated liquid, or other matters, as herein described.

The patentee grinds sulphate of lime, or gypsum, into a powder, and covers the floor of the oven three inches thick with it. The oven is then closed, and the charge remains for four hours. It is then placed in a cistern and covered with purified liquor prepared from the ammoniated fluid formed in the manufacture of coal gas, commonly called gas water. When completely saturated it is spread over the floor of the oven and dried. It is then taken out, and a fifth part of slacked lime is added to it, after which it is ground and placed in the oven for the same time as before. It is then fit for use.

Claim eighth.—The combining lime and cements with ground calcareous matter, or stones, in substitution, or in aid of, silex, or other matter.

The lime is mixed with ground calcareous matter, and burnt in the oven, after which it is fit for use.

Claim ninth.—The mode of preparing lime for use by applying soap, with or without glutinous matter, and also the method of using hot tools for finishing and polishing cemented surfaces.

Two parts of ground marble are mixed with one part of fine slacked or ground lime, with the least quantity of water possible. This is done two or three days previous to using the same, but it is tempered once or twice a day with a beater or other tool. The patentee next takes one pound of soap, and dissolves it over a slow fire in about six quarts of water, occasionally adding two ounces of glue or other glutinous matter to the same, by which means the cement is rendered more tenacious. He takes the composition prepared as above, and adds to it the color, to form the tint required for the ground color, and brings it to the consistence for use by pouring into it the soapy solution, mixing it well, and applying it in the manner that stucco is at present done. When it is done a highly burnished hot metal tool is passed over the surface, which will unite the whole, and form a good polish.

Claim tenth.—The mode of preparing cement from lime, by means of oil and water, with or without other materials, as herein described.

To any number of gallons of clean water add as much fresh burnt lime as will when slacked bring it to a semi-fluid consistency. When it is half slacked add as many quarts of oil as there are gallons of water, and stir this well together until the whole is properly mixed. Then strain it through a fine sieve, and when cool it is fit for use. It is applied in the same manner as when plastering with stucco.

Claim eleventh.—The combining aluminous earths and ground clinker, or slag, or scoria, from the smelting furnaces; and the forming and burning of tiles thereof. Also the forming of tiles or burnt rough surfaces to be used in substitution of laths, to receive cemented surfaces as herein described.

The tiles are made of three parts good aluminous earthy matter, mixed with one part of ground clinkers &c., from the smelting furnaces, and when properly tempered they are made, dried, and burnt in the same manner as roofing tiles. They are made rough on one side so that the composition applied may adhere freely in the same manner as the pricking up coat, thus serving the double purposes of laths and the pricking up coat.

Claim twelfth.—The mode of treating articles made of lime or cement, and calcareous stone or earth, by placing them in chambers with carbonic acid.

The articles previously wetted with lime water are placed in the chamber mentioned in the fourth claim, and exposed to the action of the carbonic acid, by which they acquire great hardness.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page* 117.)

Hugh Unsworth, of Blackrod, Lancaster, bleacher, for *certain improvements in machinery or apparatus for mangling, drying, damping, and finishing woven goods or fabrics*, Feb. 27.—These improvements consist: Firstly; in a certain combination or arrangement of mechanism or apparatus whereby all such processes of mangling, drying, damping, and finishing, employed in bleaching goods or other operations, may be performed in one machine, instead of being separately effected by distinct machines or processes as hitherto done; and thus producing a much better "finish or condition" upon the calicoes or other fabrics, and also greatly economising hand labor.

Secondly; in passing the cloth after it has been once dried again partially through the mangling or calendering portion of the apparatus, and in contact with the wet cloth, in order that the dry cloth may thus be damped or "conditioned," which necessary process in finishing woven goods or fabrics is usually performed separately by a damping machine.

And lastly; in the application of a drying cylinder to the ordinary mangling or calendering apparatus, thereby rendering that machine much more effective in its operation upon the cloth in those instances where the improved combination of machinery is employed in mangling only, and not for the finishing process.

The wet cloth as it comes from the squeezers after bleaching is placed upon a table and first guided by the hands of the attendant over and under the stretching rails, and passed between the two lower mangling or calendering rollers (of which rollers there are six in the machine), where great pressure being applied it proceeds immediately around a drying cylinder (heated by steam through its axis) attached to the machine, where it may be only partially dried, and passing onwards is submitted to the upper calendering rollers, and then proceeds around four other drying cylinders. The dried cloth is again passed into the machine at the back, and goes through the calendering rollers a second time, in contact with the wet or only partially dried cloth. It thus receives the operation of damping by such contact only; instead of being separately damped by another machine, as heretofore.

Thomas Robinson Williams, of Cheapside, London, gent., for *certain improvements in measuring the velocities with which ships, or other vessels or bodies, move in fluids, and also for ascertaining the velocities in motion*, Feb. 27.—Claim.—In the first-described apparatus the general arrangement, and especially the reversed open-mouthed tube, as well as the double water cistern; and in the second and last, the general arrangement of the instruments, together with the tow plummet, conical or otherwise, or a number of towing plummets, or a flexible rope saturated with india-rubber or other adhesive material, or a close flexible chain, or, in fact, the towing of any body after or from a vessel for obtaining a resistance (not rotary) for operating upon the herein-described instruments, or any other weighing-instruments which might be used herewith on board of vessels for ascertaining the velocities, or by the same means in fixed positions for ascertaining the velocities of currents, whether they be in water or other fluids.

For river navigation the patentee uses a bent tube, which he prefers to be of copper, inserted either through the stern post or keel, or by the side of either of them, and pressed down the stern post to near its keel, and then bent backwards, that is, in a direction contrary to the bows or head of the vessel, and made to point rather below or under the rudder; it projects but a short distance from the stern post according to its size, and should be merely of sufficient length to be clear of the dead water behind the post or keel; this end is left open to the water. The other or inner end is then bent upwards through the floor of the cabin, and has a float bob of light hollow glass or metal with a rod attached, provided with a scale similar to common carriages for steam, &c.; or where the water line is not inconveniently low, a strong glass tube is made to form the upper part of this tube, including the water line; that is the point to which the water will rise when the vessel is not in motion. This then becomes the zero point upon the scale, and the velocity with which the vessel sails, producing a partial exhaustion of the water from this tube, or a depression of its surface therein, consequently indicates the speed with the greatest accuracy. There may be also attached to this main a bent glass tube, the two ends being upwards, and one of them connected with the main, the other open to the atmosphere. This bent tube being partially filled with mercury and having a scale attached, indicates the velocity by the surface of the mercury in the proportions of the weight of mercury to that of water.

To remedy the inconvenience of the fluctuations of the weight of cargo, the patentee provides a water cistern of one, two, or three feet square, and of sufficient depth, and places it in the most convenient situation as near midships and over the keel as possible, having small external communications through the bottom of the vessel, through which the water may flow in and out that its surface may always correspond with the external water line. Within this box or cistern another flat hollow metallic or other box is made to float, but so as to sink considerably below the surface of the before-mentioned cistern, and through the bottom of this floating box is firmly soldered or fixed either the single or bent tube with its scale, connected by a flexible india-rubber or other tube with the main.

Another apparatus for sea or river navigation, whether by wind or steam, and for all general purposes, consists of an instrument suspended in gimbles, or, in other words, by a universal joint, in any convenient part of the vessel, such as the companion-way or captain's room, and a plumnet or drag or a drag chain or line, &c., to be towed overboard and attached thereto, as herein-after described.

The instrument is composed of an iron cylinder or chamber of about an inch and a quarter internal bore, and eighteen inches in length, connected at its bottom end by a bent tube with the bottom of a glass tube, the upper end of which is open to the atmosphere, and on the front part is a graduated scale, which denotes the knots per hour that the vessel sails. A plunger of hollow glass, or other material, with the bottom end closed, is made to slide freely in the iron chamber, and from the cap of this plunger projects an ear or staple, to which a strong flexible silk cord is fastened, which passes round a pulley at the bottom of the instrument and over a pulley attached to the standard by which the instrument is supported, and thence into the water, and is towed after the vessel.

The glass tube is filled up to the zero point on the scale with mercury, the mercury rising to the same level in the iron chamber, so that on the plunger being pulled down upon the surface of the mercury by the silk cord, it will cause the mercury to rise in the glass tube, and so show the number of knots per hour the ship travels.

The drag to be towed overboard for occasioning the resisting power (which resistance will always correspond with the velocity of the vessel), and for operating upon the instrument by the cord connected therewith, may be of various kinds as well as shapes. In some cases (says the patentee) I have used merely a plain braided rope of 100 feet or more in length, and of the size of the common log line, which it is better to saturate with india-rubber or other adhesive materials to prevent wear. This plan I prefer for measuring currents or small velocities, and in shallow water. In other cases I have

used a plummet of metal or glass similar to the deep sea lead, and if this is used, about half the length of line only is necessary. But what I have found best for practice at sea, is a smaller line of about a quarter of an inch in diameter, and 200 feet long, having a number of conical or egg-shaped plummets of metal, glass, or ivory, upon it, at the extreme end from the ship, about three feet apart. Twelve of these with a line of this length, at the speed of 10 knots per hour, indicate 6 lbs. avoirdupoise upon the pound and ounce scale of the instrument, or 10 knots upon the scale of knots by the mercury. The pound and ounce scale is intended as a ready way of adjusting the instrument at all times, by proving it with such weights attached on shore.

If the instrument be hung in the cabin, it is preferable to work the plummets, or drag, from the stern; and in order that the point of suspension of the cord or line be as near the surface of the water as possible, a hole is bored through the stern in a slanting direction downwards, as near the middle of the vessel as may be, but avoiding the rudder. To prevent the line rubbing the sides of this hole, two pulleys are inserted in the wood work of the stern, outside, one above and one below, to take off the friction from the cord.

This instrument is also made to show the trim of a vessel; perpendicularity being always maintained by its manner of suspension. A strong table is placed immediately under it, having upon its surface a metal plate, horizontally secured; when the vessel is in perfect trim as to stem and stern, as well as crosswise or otherwise, the best determined position for sailing. This plate has a centre point, placed precisely under an index point, which extends from the bottom of the instrument, and is as near the plate as possible without touching it. The plate is divided into lines, running at right angles with each other, one half longitudinally with the vessel, and the other at right angles thereto; these lines or divisions are calculated to form degrees of a circle (the length of the instrument from its point of suspension to the index point, being the radius); and consequently show at all times the degree of inclination (if any) which the vessel has acquired from the perpendicular or previously best-determined sailing position.

The following is another description of instrument:—a barrel or arbor is supported in the raised parts of a frame; and upon this barrel the inner end of the tow-line is wound a turn or two, and secured to it; two weights are attached to the barrel, which occasion the necessary resistance, as they are more or less lifted by the partial revolution of the barrel when the tow-line is pulled by being dragged through the water. There are two other smaller weights, which are attached to curved arms; those arms carrying a scale or card upon which is marked the miles or knots per hour. It must be observed, that these arms and weights are suspended upon (although loose and independent of) and act from the same centre of gravity as the barrel, the pivots of which pass through them within the raised parts of the frame. It is necessary for the perfection of the instrument, that the distinct weights which govern the position of the scale or card, and the index, should be freely and equally acted upon by gravity, although their relative weights are unimportant.

The index wire is firmly fixed in the barrel, and passes over and across the card or scale, and is made to work as close to the scale as possible without touching it. It will be seen, that as the barrel, with the weights attached to its under side, is more or less acted upon by the resistance of the water and the tow-line, so will the index point out upon the scale (when properly adjusted) the number of knots per hour which the vessel is sailing.

ENTERED AT THE PETTY BAG OFFICE.

(Continued from page 101.)

BENJAMIN HICK, junr., of Bolton le Moors, Lancashire, engineer, for *certain improvements in regulators or governors, for regulating or adjusting the speed or rotary motion of steam-engines, water-wheels, and other machinery,* Feb. 27.

This improved governor is applied to the throttle valve of steam engines, in place of the ordinary pendulum governor.

The ordinary iron standard or frame of the governor, is placed as usual over the crank shaft of the engine, on which is fastened a bevel wheel that drives a pinion attached to an upright spindle or shaft; by this means, a rotary motion is communicated to the spindle, which revolves in suitable bearings in the frame. The upper part of this spindle is cut into a screw, on which a bush or nut, having an internal screw, works; this bush, having two arms extending from it, to each of which is attached a vane; and the bush is connected to the throttle valve of the engine by links and a swivel, and connecting rods and levers, in the usual manner.

If the crank shaft overruns or increases its ordinary velocity, it will cause the bush to rise up the spindle, and by means of the connecting rods and levers, partially close the throttle valve; on the contrary, if the crank shaft decreases its ordinary velocity, the bush will descend, and so open the throttle valve wider, in order to admit an additional quantity of steam to the engine.

The patentee does not confine himself to the above, as the parts may be varied to suit circumstances.

JOSEPH LOCKETT, of Manchester, engraver, for *certain improvements in manufacturing, preparing, and engraving cylinders, rollers, or other surfaces, for printing or embossing calicoes or other fabrics,* Feb. 27.—Claim.—The application or use of the principle, force, or power of galvanic or voltaic electricity, for the purpose herein described only; and also the rotary cutting or turning apparatus, subsequently employed upon rollers or cylinders so manufactured or prepared.

In order to form a cylinder, the patentee provides a shaft or mould of the diameter required, which may be either a conductor of electricity, and form part of the cylinder when it is finished, or it may be a non-conductor, and afterwards changed into a conductor, and removed from the cylinder when it is made. This shaft is immersed in a vessel containing a solution of a salt of copper, and is connected by a wire to the positive pole of a voltaic battery. A surface of metal, from which is to be formed the cylinder, is placed in the vessel touching the shaft, and this metal is connected by a wire to the negative pole of the battery, and the battery being put in action the cylinder is formed.

The patentee likewise erases portions of engraved plates or cylinders when required, by filling up those parts with metal. Those parts of the plates which are to be preserved are coated with varnish, and the parts to be erased are first cleaned with water, containing one-twentieth part of its bulk of nitric acid, and then coated with metal by the above described electric process.

The cylinders, after being formed as first described, are filed smooth by means of a rotary file or cutter, turned by suitable gearing.

WILLIAM CHURCH, of Birmingham, civil engineer, for *improvements in fastenings applicable to wearing apparel, and in apparatus for making the same, and also in the method of preparing the articles for sale,* Feb. 27.—This invention consists of improvements in spring hooks and eyes; in the cards for receiving the same; and in the machinery or apparatus for making the spring hooks and eyes.

The patentee contracts the beak of the hook, but preserves a sufficient opening in that part which is occupied by the spring tongue to allow of its playing freely.

That part of the eye which is to lie between the beak of the hook and its spring tongue, is made of a straight form and rounded, whilst the other parts are flattened. The patentee also forms a piece of wire into a sort of staple, as a substitute for ordinary loops or eyes, to be used in connection with the hooks.

The cards to receive the hooks and eyes are pierced for the purpose of forming loops, which may be done by a pair of dies, that will cut and at the same time raise the loop; a pair of hooks and eyes are then slipped into each loop.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 8th of May.

John Duncan, of Great George-street, Westminster, gent, due May 2.

Elijah Galloway, of Manchester-street, engineer, due May 2.

Josiah Pumphrey, of New Town-row, Birmingham, brass-founder, due May 2.

Henry Wimshurst, of Limehouse, ship-builder, due May 2.

James Heywood Whitehead, of Royal George Mills, York, manufacturer, due May 2.

James Boydell, junr., of Cheltenham, due May 2.

John Edward Orange, of Lincoln's-inn, Old-square, captain in the 81st regiment, due May 2.

Herman Schroeder, of Surrey Cottage, New Peckham, broker, due May 2.

John Wordsworth Robson, of Wellclose-square, artist, due May 2.

PATENT LAW CASE.

INFRINGEMENT OF A PATENT.—In the Vice-Chancellor's Court on Saturday, an application was made *ex parte* on behalf of Messrs. Tyzack, for an injunction to restrain the defendants, Messrs. Nicholson and Son, who are shipwrights at Shields, from manufacturing certain windlasses, which were alleged to be an infringement of a patent obtained by the plaintiffs in 1832, "for an improvement in windlasses and machinery for winding up cables on board ship." The plaintiffs, having been informed by Messrs. Ogle and Douglas, licencees of their invention in Sunderland, that they had seen a windlass fitted on board the brig Cyprus of Sunderland, Captain Farmer, belonging to Caleb Wilson and Son, and ready for sea, exactly the same as the plaintiffs', and having the name of W. Nicholson and Sons, sent Ward, their engineer, to inspect it, and finding it identical in principle with the plaintiffs' invention, they called upon the defendants for an explanation. The defendants, however, insisting the windlass constructed by them was no infringement of the plaintiffs' patent, it had become necessary to file a bill against them, and submit the question to the consideration of the Court. The Vice-Chancellor said the difference in the defendants' invention appeared to him *primâ facie* to be only colorable, and granted the injunction.

FOREIGN INTELLIGENCE.

FRANCE.

EMPLOYMENT OF CHILDREN IN MANUFACTORIES.

The Chamber of Peers have concluded the discussion on the projected law respecting the employment of children in manufactories, and have adopted all the provisions of that law. The arrangement relative to the permission of night work was modified by general consent, so as to reconcile the interests of trade with the protection due to children. Excepting in case of any of the machinery being broken, and requiring immediate reparation, night work is to be allowed only in manufactories where a constant fire is required; but, on the other hand, the law declares, that by "constant fire" is meant that which cannot be interrupted during the course of twenty-four hours, which gives this term a more extensive sense than is strictly implied. There remained a final point, with respect to which the reporter of the commission, M. Charles Dupin, made great exertions to

induce the chamber to adopt his opinion; it related to the vote by which the Chamber of Deputies suppressed the penalties established by the original plan against the parents and guardians of those children who were illegally employed in manufactories. The law declares the masters of the manufactories to be responsiblo in the first place for any infringements committed. What the commission recommended to the chamber through the medium of M. Charles Dupin was, not to agree to that vote, and to re-establish the penalty against parents. The commission conceived that the impunity allowed them would be the means of avoiding the law; since children, after having worked for eight hours in manufactories subject to the law, might still be compelled to work in establishments where the law was not in force. The Minister of Public Instruction showed that all the hours of the day were regulated by the law in such a manner that any deception would be impossible. The chamber rejected the alteration demanded by the commission, and confirmed the vote of the Chamber of Deputies.

ARTESIAN WELL AT GRENELLE.

On the 26th of February, at twenty minutes past two, the water spouted up from the Artesian well, which has been boring at the Abattoir de Grenelle. This water is tepid, which it was very natural to suppose would be the case, on account of the temperature of the deep strata which have been reached. The depth of the well is of 560 metres (1,837 feet). This result, which has cost more than 160,000 f., is the fruit of a persevering work of several years, and solves a geological problem of the greatest importance, that of the existence of water under the immense beds of green sand of the basin of Paris. The water is greenish, without either taste or smell; it dissolves soap, and preserves a temperature of between 28 and 30 degrees (80 to 86 Fahrenheit) when it reaches the level of the soil. M. Mulot, who directed the works, is of opinion that it will be quite limpid in a few days. No preparations have been yet made to give a destination to the waters, which come out in a torrent.

M. Mulot, the engineer who directed the works of the boring of the Artesian wells of Grenelle, has been appointed Knight of the Legion of Honour.

The French Academy of Sciences, on the 26th ult., elected M. Ancelot as a member, in the room of M. de Bonald. M. de Tocqueville was a candidate with M. Ancelot, and the votes were nearly equal.

Infringement of a Patent.—The Cour Royale, in Paris, lately gave judgment in the cause of an Englishman, Mr. Neville, against two persons named Doninelli and Vezeggi, for piracy of an invention for an improvement in the manufacture of silk. It appears that Mr. Neville had a patent in France, but was in Italy at the time when Doninelli and Vezeggi formed an association for carrying on the process in Paris. The Tribunal of Commerce had already condemned them to a fine and damages for the piracy, viz., Vezeggi to 100f. fine, and Doninelli to 500f., and both to 200f. damages. This sentence, appealed against by the defendants, has been confirmed by the Cour Royale.

Fatal Accident from Machinery.—The *Rouen Journal* recounts the following accident which happened a few days ago to M. Napoléon Gallet, member of the Council of Prud'hommes, of that town: —"Observing a trifling derangement in part of the engine at his establishment, at Mont-Riboudet, he tried to rectify it without stopping its motion, but was caught by the sleeve of his blouse, and his left arm was instantly wrapped like a ribbon round the axle, and his body whirled round repeatedly, receiving the most severe contusions, particularly one of his legs, which was in constant friction. Although the machine made forty evolutions in a minute, M. Gallet retained sufficient presence of mind so to bend his head as to save it at each turn from being crushed between the machine and the ceiling, where the space was too small to allow it to pass One of the workmen made an attempt to release him, but was also caught, and would have suffered the same fate had not the engineer, hearing their cries, stopped the movement. M. Gallet was taken away in the most deplorable condition, his arm being broken into four or five different parts. Notwithstanding the number of the injuries, his surgical attendants entertain hopes not only of saving his life, but of restoring him to the use of all his limbs."

BELGIUM.

EXPORTATION OF COALS.

The Chamber of Commerce at Liège has received from government documents relative to the trade in coal, carried on by England with the ports in the Mediterranean, which present very advantageous returns. The same advantages being now offered to Belgium, they who are interested in the announcement can inspect these documents at the chamber of the secretary.

The *Courrier Belge* states that the Emperor of Russia has ordered, from one of the principal cabinet-makers in Brussels, an article of furniture of great magnificence. Many kinds of metals will be employed in the manufacture, and it will be adorned with numerous carvings. It is said that upwards of thirty workmen will be occupied for many months in making this article of furniture; and one of the first engravers in tho country, M. J. Delpierre, has been engaged on the ornamental part of the work.

A letter from the Hague of the 23d ult., says:—"We are happy to announce the entire completion, in ten days only, of the immense work of cutting a channel in the sea from Nieuwe-deep to Amsterdam, in spite of all the difficulties of the execution. The first ships from the sea have already arrived in our docks; some ships left yesterday to go to sea, and fifty lighters went to the Nieuwe-deep to recover the whole or part of the cargoes of several East Indiamen now lying there.

THE RIGHT OF PATENTEES.

The following report of cases in which attempts were made to deprive the patentees of the invention for preventing rust in boilers, of their claim to remuneration, is given in *L'Audience*, a judicial periodical, published in Paris:—"In one of our numbers of last December we informed our readers of the discovery made by Messrs. Neron and Co., of a process to preserve steam-boilers from rust, which is the most active agent in the destruction of metals, and is the general cause of explosions and occasioning a considerable loss of heat. This invention, which is so highly important to the whole manufacturing interest, has been the subject of numerous scientific reports from learned commissioners. The important discovery has been made public in a prospectus drawn up by the inventors, in which they observe:—'We are, says this prospectus, acquainted with a process which will prevent rust, but as no one is obliged to take our word for its efficacy, of which we are certain, we will allow a month, two months if considered necessary, for the fact to be ascertained; and it is not till the expiration of that time that the sum charged for this process, will be required to be paid. During that time we shall be ready to hear every reasonable objection that may be suggested, and should the appointed time elapse without any tangible objections being urged, we shall be pronounced entitled to the price of our engagement.'

"There are, however, some persons, who, having tried their process on these liberal terms, on the pretext that the efficacy of the process has not been sufficiently demonstrated, have endeavored to raise an objection, and have refused to pay. The most notable of these are Messrs. Pihiet, Rosset, and Delafontaine, against whom the Tribunal of Commerce of tho Seine, at its sitting on the 19th of October last, passed the following judgment:—

"'The tribunal seeing that Messrs Pihiet and Co., residing in Paris, have treated with MM. Neron and Co., for the process of the latter to prevent rust produced by steam; and this according to the conditions of price and terms of payment arranged between them:

"'Seeing that the plaintiffs treating with the customers for their process, have granted a delay that its efficacy might be proved, having even extended the time of this delay in accordance with the wishes of several of them:

"'Seeing that Pihiet and partners have allowed this interval to elapse without any acknowledgment; and the times appointed for payment being expired:

"'On these accounts the court condemn Pihiet and Co. to pay the sums demanded, and the expenses.'

"On the 8th ult., a case of a similar kind came before the same tribunal. Messrs. Debergne and Sprecifico were also condemned to pay the amount of their subscription for the same invention. On this occasion the defendants did not offer any defence; the tribunal, maintaining the principles of its first decision, pronounced a similar judgment against them."

RAILWAY INTELLIGENCE, DOMESTIC AND FOREIGN.

Lancaster and Preston Railway.—The directors have declared a dividend of five per cent. per annum from the clear profits for the first half year from its opening. This is only seven-ninths of tho net profits—two-ninths being carried to a reserved fund. The cost of the Lancaster line was £20,000 per milo—the highest estimate from Lancaster to Carlisle is £15,000 per mile.

Great Western Railway.—We understand that at a recent meeting of the directors of this company, rewards of three and five pounds were assigned to several of the company's engine-drivers, for their steady conduct and attention to their duties during the last year.

Box Tunnel.—This stupendous work, by far the greatest of its kind in this or any other country, is fast approaching completion—less than forty yards in length now remain to be excavated, and there is every probability that the entire work will be finished within a month or six weeks. The length of the tunnel is 3,128 yards, or forty-eight yards more than 1¾ mile. The width is 30 feet, and the height, from the line of rails to the crown of the arch, varies, according to the nature of the ground excavated, from 25 to nearly 40 feet. The total quantity excavated cannot amount to less than 450,000 cubic yards. The work being unavoidable in this locality, we cordially congratulate the company on its successful progress and near approach to completion. It is unquestionably the boldest and greatest specimen of tunneling which the enterpriso of our monied and scientific men has yet produced.—*Bristol Standard.*

London and Blackwall Railway.—On Friday week the general meeting of the proprietors and shareholders in the Blackwall Railway Company took place at the London Tavern, Bishopsgate-street. The report set forth, that since the last meeting of the shareholders the railway had been in uninterrupted operation, notwithstanding the impediments caused by the late frost and heavy fogs. The number of passengers conveyed along the line up to December last was 949,246, being a period of less than six months. The report referred to the communication with steam-boats at Blackwall, and stated that the directors had entered into arrangements with numerous steam-boat companies to land their passengers at the company's wharf in the ensuing season. The report then alluded to the extension of the line into Fenchurch-street, and in order to carry it out the directors recommended that the sum of £150,000 be raised by new shares. The receipts from the 6th of July to the 31st of December amounted to £15,781 11s. 6d., and the expenses for fuel, wages, &c., to £7,630 1s. 3d.

Northern and Eastern Railway.—The half-yearly general meeting of the proprietors of this company was held on the 18th ult. The report stated that, although the partial opening of the

railway had taken place under the disadvantages of a winter traffic, the traffic had repaid the cost of conducting it, which furnished a proof that at the more favorable season the receipts would afford a lucrative return. Two lines of rails would be immediately completed as far as Broxbourne. The directors hope that the line to the Harlow Road will be opened in July next: the purchase of land had been completed as far as that point, and considerable progress had been made between the Harlow Road and Bishop's Stortford. The whole cost of the railway, when completed, would be £22,000 per mile, including every expense. Application is about to be made to Parliament to make a branch railway to Ware and Hertford; a survey had also been made from Stortford to Cambridge, in order to enable the company either to continue their line to the North of England, the north-western side of the country, or the counties of Norfolk and Suffolk. The statement of receipts and expenditure for the half-year ending December 31st, 1840, was as follows:—

	£.	s.	d.
Receipts	123,576	16	6
Expenditure	122,358	12	8
Balance in hand	£1,218	3	10

Sinking of another Arch at Crew Mills Viaduct.—The attention of the engineer to the Midland Counties Railway Company was last week attracted to one of the arches joining part of Crew Mills viaduct (of which three arches some time since fell in and caused a partial stoppage of the traffic), in consequence of the soil having sunk to a depth of four or five inches, and the result was that the morning trains on Wednesday were drawn over the part of the line by men, the engine being detached, as it was deemed inexpedient to take it over on account of its great weight. A number of men were immediately procured and employed to "ballast" the road, so as to raise it to the same level as the other portion, and in the afternoon the trains proceeded as usual. Since the subsiding of the soil every exertion has been made to render the arch in question and the remaining portion of the viaduct quite secure, by filling up the centre of the arches with brickwork and erecting cross arches underneath to support them.

Horse Killed on the Midland Counties Railway.—As one of the trains on this line of railway was coming along on Saturday afternoon, a horse belonging to Mr. Edward Betts (son of the contractor for the company), which was being led along the road at the time, became restive, and plunged on to the line of rails along which the train was coming, when it was killed on the sopt. Fortunately no other injury resulted.

A Passenger Killed by falling from a Carriage.—On Tuesday evening, as the eight o'clock train of the Brandling Junction Railway was proceeding to Sunderland, when about half a mile from the Gateshead station, a sailor (one of the passengers) fell from one of the carriages, and was killed on the spot. An inquest was held upon the body, when it appeared that the sufferer was observed to have left his seat, and was passing along the footsteps from one carriage to another, and unfortunately fell off. Verdict, "Accidental death." Deodand upon the engine and carriages, 5s.—*Durham Advertiser.*

Maryport and Carlisle Railway.—A general meeting of the shareholders in this company was held at Aspatria, last week. A report was read from the directors showing a profit of $2\frac{1}{2}$ per cent. per annum since the opening of seven miles at Maryport in July last. There are several coal pits opening near the line, and it is expected the revenue will be nearly doubled in a short time. Nearly £5,000 was invested in new shares at the meeting, which puts the company in a position to raise funds by borrowing. It is probable that the line will be commenced from Carlisle to Wigton in the course of the summer.—*Carlisle Patriot.*—The Gilcrux Colliery Company are again conveying their coals by the Maryport and Carlisle Railway for shipment at the former place; and the transit of coal upon the railway is now immense: and it is confidently expected that at the next half-yearly meeting, four or five per cent. profit will be declared.—*Correspondent of Carlisle Journal.*

The Mails Conveyed by Railway.—The Postmaster-General has arranged with the various railway companies on the lines north of the metropolis for the intended acceleration of the mails, to take place on the 6th of April next. The saving of time to be thus effected will, it is said, amount to about three quarters of an hour, as far as this immediate neighbourhood is concerned.—*Tyne Mercury.*

The Eastern Counties Railway Company are actively engaged making bricks in the Town Field, Chelmsford, which presents an immense quantity of material for the work. A long row of huts or cottages have been erected on one side of the field, as dwellings for the brick-makers.—*Essex Standard.*

Edinburgh, Perth, and Dundee Junction Railway.—The Edinburgh committee for promoting this railway through Fife, by what has been termed the western line, have lately had two meetings. In order to obviate the chief objection (consisting of two inclined planes), which have been made to this line, as proposed by Mr. Milne, several alternative routes, by which these may be obviated, have been surveyed and described by that gentleman. Mr. Locke, whose opinion is to be taken by the committee, having been absent on the Continent, the line has been examined and approved of by Mr. Errington, his chief assistant. By the support which this line is likely to receive from Perth and Dundee, the promoters of it entertain confident expectations that it is the line which will be finally adopted, as being the best for all parties interested. —*Edinburgh Chronicle.*

Edinburgh and Glasgow Railway.—The sixth half-yearly general meeting of the proprietors of the above line of railway was held on Monday week in Glasgow, John Leadbetter, Esq., chairman of the directors, presiding. The directors reported favorably of the progress of the undertaking during the last six months; they look forward to the opening of the line in August, and they state that the sum expended on the works since last June till December amounts to £194,179 7s. The report was unanimously approved. The next subject was one of great importance to the undertaking, namely, whether the line, after its opening, shall be divided into two portions, called the Edinburgh division and the Glasgow division, the management of which is to be entrusted to two committees of the general board of directors, having co-ordinate power, as has been the case during its formation, or whether the whole is to be managed as one entire and continuous railway by the general board itself. Mr. Leadbetter moved a series of resolutions in favor of concentration, and a concentrated board of management to sit in Glasgow. Mr. Learmonth, of Edinburgh, moved as an amendment, that the line should continue to be managed as hitherto. The meeting came to a decision in favor of the concentrated plan.

Glasgow, Paisley, and Greenock Railway.—This important undertaking is fast drawing to a close. The Bishopton tunnel, a work of immense magnitude, is on the point of being finished. On visiting it in the early part of the week, we found that the rails were laid double nearly the whole length of the tunnel, and that a little clearing away at the east and west entrance was all that was required to complete it. Parts of the approaches both to the east and west of the tunnel were still to clear out, but there were on these parts about 400 men, very busily employed. The workmen seemed confident that the double line would be open to the public about the first week in April. The whole of the passage through the tunnel is curved, so that the eye cannot see from end to end, but from the middle of each, light can be seen from the end and from the eye. The part of the railway from the tunnel to Greenock has been run on by the engines for several months past, and both lines between Paisley and the tunnel are very nearly completed. The road over the mossy part between Barangry Hill and Gryffe has stood much better than was anticipated. Part of it had been kept somewhat higher than was intended, to make allowance for settling, but it has settled so little, that it became necessary to lower it, to near the proper level. The delay which the tunnel has occasioned has been the means of getting all the other parts of the line into a much better state than if the passage had been opened sooner throughout. The completion of this railway, besides bringing a good increase to the joint line traffic, will form a much more close connection between the central parts of the county and its principal seaport, than has heretofore existed, and will thus create work for itself. The passage from Paisley to Greenock will only take about three quarters of an hour.—*Paisley Advertiser.* The *Greenock Advertiser* states that the Government Commissioner has surveyed the line, and is so satisfied with it, that the Board of Trade has given authority to the directors to open without further examination. The Greenock paper adds, that it is intended to open even earlier than mentioned above. When the shafts of the curved tunnel met, the utmost deviation from the correct line, was two inches.

American Locomotives.—At the meeting of the Birmingham and Gloucester Railway company last week, a question was asked by a proprietor as to the cost of the locomotive engines which had been ordered from America.—The Secretary said, they cost considerably more than engines made in England; they had contracted for a certain number to do a certain amount of work, but no more would be ordered, as they could be as well made in England.

RAILWAY ACCIDENTS.

Fatal Accident from Crossing a Railway.—An accident of a fatal nature, arising from excessive carelessness, occurred to a man upwards of 60 years of age, on the afternoon of Thursday week, who was knocked down on the Great Western Railway, as he was incautiously crossing the line, by the half-past 4 o'clock train from Wootton-Bassett to Paddington. The poor fellow, who got his living by selling fruit, was struck by a projecting portion of the engine on the head, and his death must have been instantaneous; for upon his receiving immediate assistance life was found to be extinct, arising from a severe wound on the head. But very few drops of blood oozed from the wound. It should be observed that there is a footpath which crosses the line at the place where the accident occurred, where the company's men are stationed to endeavor to prevent accidents occurring through the carelessness of the public.

FOREIGN RAILWAYS.

Contracts for Rails.—The contract for the rails of the railroad from Lille to the frontier, has been assigned to the manufactories of Decazeville and Creuzot, at the price of 40 frs. 50c. per 100 kilogrammes. We understand that the manufactory of Decazeville recently erected a new furnace, intended for that peculiar work, which it hoped to obtain in consequence of its moderate charge, and the quality of its cast iron, which is particularly adapted for railroads. When they have completed the rails, they will be conveyed by sea as far as Dunkirk, and by canals to Lille. The contract for supplying the rails of the line, from Valenciennes to the frontier, has been given to the metal manufactory of Denain, at the rate of 40 frs. 58c. the hundred kilogrammes. This large manufactory has the advantage of constructing its works almost on the spot. The trifling distance which separates it from the projected road can be traversed either by the canal of the Scheldt or the railroad of Anzin. The railroad from

Valenciennes to the frontier consists of two lines; the quantity of rails estimated to be required is four times the length of the railway; but as the first line will be alone open to the public, in the first instance, half the supply of rails may be finished in two years.

RAILWAY PROFITS.

The result of the winter meetings, so far as they have yet proceeded, of those railway companies whose lines have been for some time in operation, are very encouraging to the shareholders. The Newcastle and North Shields Company have secured a dividend at the rate of six per cent. per annum; the North Union six and a half per cent.; the London and Birmingham Company eight per cent.; the London and South Western (formerly the London and Southampton) seven and a half per cent.; the Liverpool and Manchester ten per cent. (besides a bonus to the holders of original shares); and the Grand Junction fourteen per cent. As respects the Scottish Railways, the dividend of the Glasgow and Garnkirk line is six per cent.; the Ballochney ten per cent.; the Wishaw and Coltness six per cent.; and the Kirkintilloch seven and a fourth per cent. The Glasgow and Ayr Railway, which has not yet been open for six months, has declared a dividend of 12s. per share, which is at the rate of about five per cent. per annum for the time it has been open. The Ballochney Railway has been a most profitable concern. From a statement now before us it appears that the holder of 100 shares, or £2,500 of original stock, might now realise £11,600 of profit over and above his original input stock. This railway has not yet been open for more than 11 years, during which time the stock has more than quadrupled in value.

Great as this is, there is little certainty, in *some* of the rates of dividends above mentioned, to bear out the *extravagant* anticipations of profit from railway property which were at one time entertained, but still there is sufficient to encourage those who are in progress to proceed. It is a remarkable fact that in no instance which has come under our notice where a line has been opened for a reasonable length of time has the original calculation of traffic been found to be overcharged; on the contrary, the actual receipts have in most cases far exceeded the expectations of the most sanguine of the promoters.

The dividends just declared will, we hope, have a tendency to induce many persons who may be averse from speculation to invest their property permanently in that description of stock. They have already the certainty of a much better return than can be secured from the public funds or heritable securities, with every prospect of a progressive increase.—*Fife Herald.*

TO CORRESPONDENTS.

Mr. F. HAM's *letter came too late for insertion this week. It shall appear in our next number.*

"An Old Subscriber" *is informed, in reply to his first question, that the revocation of a foreign patent takes place when the invention is not brought into use within two years; but not without giving the patentee an opportunity of explaining the cause, and if the reason be satisfactory, the government will grant him relief. In answer to the second question, respecting the bill brought in by Mr. E. Tennent, it will not have a retrospective effect. The protection afforded by the Act 2 Vic. c. 17. will remain as at present.*

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of to-day.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 21 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes containing the Nos. of every 6 months.

THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, MARCH 6, 1841.

Having last week examined the claims of inventors to the enjoyment of the property they create, we now propose to inquire whether the possession of the rights they claim interferes with the public interest. In this consideration of the subject we must not limit our investigation to the operating effect of any one protected manufacture, but must extend our views to the general effects of such protection, in stimulating the production of other inventions beneficial to the community.

There can be no doubt that the direct effect of granting an exclusive privilege to manufacture and sell any article is to enhance the price to the public, by preventing competition; but it should be borne in mind, that the manufacture thus protected is a new creation; that if it be injurious to the public to pay a higher price for an article of utility than it could be otherwise procured, it would be a still greater injury were the article not to be purchased at any price. Yet this is assumed as the ground on which the monopoly is granted; for if the contrivance be not new, all right to exclusive sale is destroyed. Therefore, admitting the price to be exorbitant, the public have no real ground of complaint; for, as the invention which is found to be useful, or convenient, is a new creation of the inventor's, the world is indebted to him for the addition to the general stock, whatever be the terms he exacts for its participation. But it is contrary to the interest of the inventor himself to charge a price for his articles which would check consumption. In this respect he must be guided by the general principles of trade; for the more accessible an article is to the public, the greater will be the demand. Nor does it follow, as a matter of course, that the price charged for a patented article, even when high, is really more than fairly remunerating; for it is not only the actual cost for which it could be manufactured that should be considered, but the time, labor, and expense of the experiments before the invention is brought to perfection. It is these circumstances which form one ground of the inventor's claim to protection, that necessarily enhance the selling price of the article manufactured; and were competition allowed by those who copied from the perfected invention, without having been at any expense in the previous experiments by which it was brought to perfection, the original manufacturer would have to contend at great disadvantage, and would be obliged to sacrifice the time and money that were spent in creating the property that others would be enjoying without any previous labor or expense.

It would be, however, to take a very narrow view of the manner in which the public interest is affected by the privilege of exclusive sale granted to patentees, were we to confine it to the consequently enhanced price of the protected manufacture. If there be a demand for such manufactures, it is a proof that the invention is in someway advantageous to the public; if there be no demand, the patentee, and not the public, is the sufferer. We may assume, therefore, that patented inventions may be of great public benefit, and cannot be directly public injuries. To foster inventive genius, and to encourage improvements in machinery and discoveries in science, is to confer advantage on society, without the possibility of inflicting any general injury. The product of the labor of ingenious men, if successful, may be of national importance, and is sure to be of some utility; while, if they fail, the loss falls almost exclusively on themselves.

It consequently becomes a question in which the national interest, as well as individual convenience, is concerned, to determine in what manner inventive genius can be best stimulated to action. The privilege of enjoying the fruits of industry, by protecting from piracy the property created, we have shown to be a claim founded on the soundest basis of natural right; and if the free exercise of this right afford sufficient stimulus to improvement and discovery, the protection of individual rights and the promotion of public benefits are thus in happy unison. We doubt, indeed, whether this simple protection to inventors—even allowing it to be granted as a right, instead of being made a matter of favor and purchase—be the extent to which their ingenuity ought to be encouraged. We think that direct encouragement ought to be afforded, independently of the chance of remuneration from sales; but, at all events, the right to exclusive manufacture and sale affords a stimulus, so far as it goes. It is the inventor's absolute

right, founded on the firmest basis; it inflicts no injury on the public, whilst it holds out the inducement to general improvement.

There are some considerations, however, connected with this subject, which render it doubtful how long an inventor should be allowed to enjoy the exclusive privilege to sell his invention. It often happens that the new adaptation of machinery, or the novel application of a scientific principle, suggests other and far greater improvements, which cannot be carried into effect without infringing the patent right of the original discoverer. In such cases the public are hindered from enjoying the advantage, owing to the exclusive privilege of the patentee. The latter, indeed, has the merit of suggesting the improved process, and probably without his first discovery the improvement would never have been made; but how long is he to stand in the way of the full development of the views which he has been the means of only partially opening? In questions of this kind it would be better for the Government to interfere, as in Belgium, to purchase the right of the patentee for the good of the public; but, in the absence of any regulation of that kind, it seems necessary to limit the extent of the patentee's privileges. The term of fourteen years, which is the extent of protection at present purchased by a patent, is inadequate, in many instances, to remunerate an inventor, or to enable him to get his invention properly made known. In other cases the term is quite long enough, and even a shorter period might be sufficient protection. One fault of our patent laws is, that they do not discriminate. The same fees, the same terms, are exacted and granted, whether the invention be a steam-engine or a button. Were the Government to interfere more directly in the granting of exclusive privileges; if they were not made mere matters of course; and encouragements were held out to inventors of a more direct nature than the mere grant or sale of a monopoly, the difficulties attending improvements in inventions might be regulated, so as to reward the original inventor, without preventing the public from being benefited by subsequent improvements.

The second reading of Mr. Emerson Tennent's bill for the extension of copyright of patterns on printed calicoes was carried in the House of Commons on Wednesday, without a division, though not without a strong manifestation against the measure by some members returned by manufacturing constituencies. Mr. Williams, the member for Coventry, urged the same objections as those made by Mr. Withers, which are given in another part of our journal. The point on which he chiefly insisted, and which seems, indeed, to be the most plausible objection to the measure, is, that it would lead to endless litigation, because it would be impossible to determine the claims to originality in designs, which consist, for the most part, only of new combinations of old figures and patterns. In proof of this assertion he quoted the evidence of a Manchester manufacturer, before a committee of the House of Commons, who asserted that, after an experience of thirty years, he had never seen but *two* original patterns. But the same objection applies equally to the present short protection of three months, and, if valid, would apply to the removal of all protection whatever. This argument, however, is more directed against the defective state of the law than against the principle of protection; the justice of which was generally admitted. Even Mr. Warburton, who made so determined an opposition to Mr. Serjeant Talfourd's copyright bill, admitted it was desirable to give a reasonable reward to inventive skill; and he suggested the necessity of providing a cheap and expeditious court before which the parties might appear to assert and vindicate their rights. We fully agree with him as to the necessity of providing such a court, and we would extend its jurisdiction to all questions of disputed inventions; but the want of a proper tribunal affords no good ground for denying such protection as the law at present affords. We do not think it would be difficult for an impartial jury to decide whether a pattern was a copy or a fraudulent imitation of one previously designed; and if the protected design had really no claim to originality, we doubt not the rival manufacturers would be ready enough to prove its want of title. The great object, however, to be attained by the extension of the copyright is not so much the protection of individual rights, important as that object is, as the improvement of the manufactures of the country. The present protection is not sufficient to induce manufacturers to be at much expense in producing elegant designs, that might be almost immediately copied. Hence arises the inferiority of English patterns to those of France, where a longer protection is afforded. The general impression among the members in the House of Commons, who spoke on the question, seemed to be that six months' protection would answer the end in view, as novelty is in such fabrics the great attraction. Mr. Labouchere and Mr. Sheil, on the part of the Government, admitted the justice of more extended protection, therefore there cannot be much doubt Mr. Tennent will succeed in establishing the principle of his bill, even should he fail in carrying so ample a protection for the orignal desigus as he demands, and, as we conceive, justice to the designer and the interest of the public requires.

NEW INVENTIONS.

CORK STUFFING FOR BEDS, &c.

This invention, the specification of which we gave in our number of 6th Feb. last, bids fair to surpass all other materials that have hitherto been offered to the public. We understand that it is about to be brought forward on a very extensive scale, for which purpose a company has been formed, and we believe it is intended at once to establish manufactories in all the principal towns throughout England. It will be of the utmost importance to all persons travelling by sea, as mattresses or cabin cushions stuffed with this material will prove most efficient Life Preservers in case of wreck, which circumstance alone, after the many disastrous accidents that have lately occurred in the Channel, ought at once to ensure its adoption by the proprietors of steam-boats generally, as well as the owners of all other trading or pleasure vessels.

OPHININE PROCESS OF PRINTING.

This is the name given by Mr. Morison to a peculiar method of printing, by means of cylinders, of which that gentleman is the inventor and patentee. The principle which forms the basis of the process is, that if two cylinders be made to communicate motion one to the other, by means independent of the contact of their surfaces, they will give off on each other, or on any intervening surface, exactly the same quantity of ink as may have been received, by one or more of them, from another cylinder moved by the same influence as the first. By the application of this principle, Mr. Morison is enabled to supply a surface of types with a constant and equal coating of ink; and whether the types, or other surface to be printed from, be placed on a cylinder and moved circularly, or a vibratory movement, backwards and forwards, be imparted to a plane surface, as the supply of ink keeps pace with the movement of the surface, impressions may be taken as rapidly as two men can supply and take out paper. The inventor has further applied this principle to cylinder printing in colors, which is effected by fixing round a drum a number of cylinders, each supplied with coloring matter from a separate inking apparatus, and so arranged that their several impressions upon the paper supplied by the drum combine and form an entire figure. The motion of the whole apparatus proceeds from that of the drum, from which all the cylinders receive their movement by means of cogs. A little literary production, called the *Page of Knowledge*, ornamented with colored designs, has been produced by Mr. Morison, from a rough working model, and consequently under great disadvantages; notwithstanding which, it is evident that the principle is true, and that all the defects are owing to departures from it, which the restricted means of Mr. Morison were unable to avoid. One of the most valuable results of the process thus briefly described is, that, as the degree of pressure exercised by the rollers, one on the other, is completely under command, it becomes possible to take impressions from the slightest conceivable elevations, or from the most flexible substances, without wearing or depressing them. The designs in the above-mentioned pamphlet are printed partly from cork, partly from leather and soft wood, and others from relief drawings, executed by scratching on the reverse side of a thin plate of metal—a method which admits of producing designs with the greatest rapidity.

CARBOLEIN, THE NEW FUEL FOR STEAM-BOATS.

We mentioned last week the invention or discovery by M. Waschinakoff, at St. Petersburgh, of a new kind of fuel adapted particularly to steam-packets. The following is an estimate of the advantages this fuel possesses in comparison with the best Newcastle coals. The 4,480,000 lbs. of fuel usually taken on board the steam packet boats which make the voyage from England to the United States, or *vice versâ*, and occupy a space of 81,884 cubic feet; but 2,480,000 lbs. of carbolein, which produce the same effect, require no more than 51,694; so that the latter combustible affords a saving of room of 30,190 cubic feet, where merchandise may be placed, or passengers accommodated. The charge for freight from England to North America, and *vice versâ*, being two shillings and sixpence the cubic foot, which makes five shillings for the voyage going and returning, the saving of room of 30,190 cubic feet ought to produce for both voyages a surplus of £7,547. On deducting from this sum £643, that the quantity of carbolein requisite for the two voyages would cost more than the coal, and deducting likewise £1,904 for those occasions when the cargo and number of passengers is not complete, the excess of freight gained by using carbolein will average £5,000 at the least.

METALLIC RELIEF ENGRAVING.

The following is given by a correspondent of the *Athenæum*.—Take a tablet of plaster of Paris, and, having heated it, apply wax for absorption to all the faces save that on which you intend your drawing to be, and to that one apply your drawing, executed with lithographic ink on lithographic transfer paper. Let the side of the tablet on which is the transferred drawing be now dipped in weak acid and water, and then permitted to absorb a solution of sulphate of copper. By electro-metallurgy a deposition of copper can be made on all parts stained with the sulphate,

Ere this coating be too thick, let the tablet be removed from the vessel in which this last operation has been carried on, washed, carefully dried, and a mixture of isinglass and gin be poured on it; its redundancy be gently blotted off with blotting-paper till the surface be level (*i. e.* the copper lines and isinglass cement be of the same height): again, let the deposition take place, and again its succeeding operation; after which let common black lead be rubbed over the whole surface; and the deposition being renewed, a copper mould, from which a type metal block may be subsequently cast, is now formed.—Another method. —Draw with a pen dipped in warm isinglass colored cement, and when your drawing be dry, for an instant expose it to steam, and then coat it with leaf gold. Proceed by electro-metallurgy, as in last method, and no cast is necessary.

TAMPING WITH SAND.

(To the Editor of the Inventors' Advocate.)

SIR,—In reply to your correspondent A. B., I beg to say that a publication in Dec. 1840,* of a method of tamping with sand, cannot affect my claim to priority of contrivance, when the sand tamping was publicly used by me in 1838, and I am not aware that any thing prior to this ever appeared on the subject. What may be in the December number of Nicholson's Journal, I know not, not having seen the work.

But A. B., in his anxiety to act the part of censor, has overlooked the fact, that the able and interesting article on my improvements in blasting, which appeared in your Journal, was not upon the use of sand tamping, but upon the important advantages to be derived from allowing a vacant space to exist between the powder and the tamping, and this method was, I believe, never attempted before I published my experiments.

I remain, Sir, yours,

London, March 1, 1841. MARTYN ROBERTS.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(Contributed expressly to the Inventors' Advocate.)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING MARCH 8, 1841.

Monday	Geographical Society	9 P.M.
	British Architects	8 P.M.
Tuesday	Medico-Chirurgical Society	8½ P.M.
	Civil Engineers	8 P.M.
	Zoological Society	8½ P.M.
	Architectural Society	8 P.M.
	Royal Botanic Society	8 P.M.
	Meteorological Society	8 P.M.
Wednesday	Society of Arts (illustr.)	8 P.M.
	Geological Society	8½ P.M.
	Graphic Society	8 P.M.
	Medico-Botanical Society	8 P.M.
Thursday	Royal Society	8½ P.M.
	Antiquaries Society	8 P.M.
	Royal Society of Literature	4 P.M.
Friday	Astronomical Society	8 P.M.
	Royal Institution	8½ P.M.
Saturday	Westminster Medical Society	8 P.M.
	Mathematical Society	8 P.M.

MICROSCOPICAL SOCIETY.

Feb. 15.—Prof. Owen, F.R.S., President, in the Chair.

Anniversary Meeting.

The society held their first annual meeting, Feb. 15, at 8 o'clock in the evening, for the election of officers for the year ensuing, and for receiving the report of the council on the state of the society.

The council reported that the number of members now amounts to 177. That the constitution and bye-laws of the society had been determined on and printed, together with a list of the members, and that these had been distributed among the members, the council having also determined to reprint the list annually. The number of papers and communications on subjects connected with microscopic research, which had been read at the ordinary meetings of the society, amounted to 18. These papers had all been presented to the society by the respective authors, together with a portion of the drawings, diagrams, and specimens, by which they had been illustrated. The library was reputed to contain about 15 volumes, of which Ehrenberg's great work on the Infusoria, and Dillwyn's Confervæ, had been purchased with the funds of the Society. About 100 specimens had been presented to the cabinet of microscopic objects.

The auditor's report was then read, from which it appeared that the receipts of the society since its commencement in January 1840, amounted to £354 18s., consisting of the admission fees and the annual and life subscriptions; that of this sum £64 2s. 9d. had been expended in the purchase of books, lamps, stationery, and sundries, and in defraying the expenses of the monthly meetings and rent of the rooms, leaving a balance of £290 15s. 3d., of which there were in the treasurer's hands £40 15s. 3d., and at the society's bankers, Sir J. Lubbock and Co., £250.

The president then read the annual address from the chair. After alluding to the circumstances in which the society had originated, he congratulated the members upon the degree of prosperity which it had in so short a time attained, and which had exceeded the most sanguine expectations of its original projectors; and then proceeded at considerable length to review the labors of the past year, and the contributions which had been made to microscopic science in reference to minute anatomy, animal and vegetable physiology, zoology, and palæontology; as well as the attempts which had been made to improve the microscope itself as an instrument of scientific research. He concluded by deploring the loss and death of two distinguished members, Dr. Todd of Brighton, and Mr. Field, surgeon to the Charterhouse and chairman of the Society of Apothecaries, in London; upon the former of whom he pronounced a high eulogium, which was called forth by the almost unexampled ardor of that individual in the pursuit of anatomical and physiological science, and in the collection of specimens illustrative of obscure or debative points in physiology and pathology; of which valuable collection it was announced that the greater part had been purchased by the Royal College of Surgeons in London, for the purpose of being placed in their museum.

At the conclusion of the address it was proposed by Mr. Solly, and seconded by Mr. Bowerbank, and carried unanimously, that, with the president's permission, the address be printed, and distributed among the members; and the address was ordered to be printed accordingly.

The meeting then proceeded to elect, by ballot, the officers and members of council for the ensuing year. The following gentlemen were then elected: Frederick Owen, Esq., *president*, N. B. Ward, Esq., *treasurer*, and Dr. Arthur Farre, *secretary*; the four following gentlemen as members of council, viz., J. G. Children, Esq., John Dalrymple, Esq., J. Gray, Esq., and Henry Reynolds, Esq.

Feb. 17.—The President in the Chair.

Professor Ehrenberg, and Professor Purkinje of Breslau, were elected honorary members, and Mr. Daniel Cooper an ordinary member.

Mr. Richard Owen, having vacated the chair, (which was taken by the treasurer, Mr. N.B. Ward) he proceeded to read his paper, accompanied by drawings and specimens, "On the structure of fossil teeth, from the central or corn-stone division of the old red sand-stone, indicative of a new genus of fishes or fish-like Batrachia, for which is proposed the name of *Dendrodus*."—The fossil remains which formed the subject of the present paper, consisted of three detached teeth, which were transmitted to Mr. Owen by Dr. Malcolmson. They were found in the quarry of Scat-crag, near Elgin, which belongs to the central, or corn-stone division of the old red sand-stone.

These teeth present no very remarkable peculiarities of external form; although each had sufficiently distinctive characters of its own, they differed also from one another in size as well as form. The first and largest specimen, which measures one inch and a half in length, and half an inch across the base, resembles the teeth of the crocodilian reptiles in general form, but differs in being solid; presenting a very slight excavation at the base. It is conical, rounded at the base, but becoming sub-compressed in the crown, slightly bent, and gradually diminishing to an obtuse rounded apex: in this respect resembling certain of the teeth of the *Labyrinthodon*; it resembles the teeth of this family of extinct Batrachia still more essentially in being impressed with numerous fine equi-distant longitudinal striæ, about half a line, or rather less, apart; but it is also traversed by two opposite longitudinal ridges: the surface of the tooth is otherwise smooth.

INSTITUTION OF CIVIL ENGINEERS.

At a meeting of the members of the Institution of Civil Engineers, on Tuesday the 2d inst., some important improvements in the construction of railway chairs and fastenings were brought forward by W. Cubitt, Esq., vice-president of the society, and for which improvements Messrs. Ransome and May, of Ipswich, have obtained a patent. A paper on the subject by Mr. Charles May, an associate of the institution, was read.

These improvements consist:—First, in a construction of railway chairs by which the greatest strength and accuracy are obtained. They are cast on a plan which insures the inside of the chair being quite true, and their outer form is such, and the metal so distributed, as to give the greatest strength with a given quantity of metal, and these may be supplied in any quantity, without the least variation in form or size. The mode of fastening the chairs to the sleepers is by treenails, which has of late been adopted with success on the Stockton and Darlington Railway, instead of the iron spikes. In these treenails Messrs. R. and M. have effected an improvement by compressing them about three quarters of their length, leaving the head conical to fit a hole of the same shape in each end of the chair. These holes are so arranged that no two are in the same line of the grain of the wood, as it has been found by experience that the usual arrangement causes great waste of sleepers by splitting. The wedges required for these chairs are in section a square, with the corners rounded off. They are of English oak, compressed into four-fifths of its original bulk; the most remarkable feature being, that although so compressed, they will retain their true size as long as they are kept dry, but when driven in the chair and exposed to the weather they swell and become as it were dove-tailed in.

After reading the paper, a very interesting discussion followed, in which many members took part. The applicability of the compressed materials to ship-building was alluded to, and a shipbuilder present said, that he thought it was so good as to make a ship equal to copper fastenings all over.

The moisture of the ground expands the compressed treenails, and thus gives them an increase of tightness after driving.

Mr. Cubitt stated that these patent chairs and fastenings had been approved by the directors of the South Eastern Railway Company, and they had ordered enough for 45 miles.

ENTOMOLOGICAL SOCIETY.

March 1.—W. Saunders, Esq., in the Chair.

Among other presents announced, were four larvæ (caterpillars), which had been dried and blown by a German entomologist with very great care. Owing to the very soft nature of larvæ, it has been found very difficult to preserve them for the cabinet, but the specimens on the table were beautifully prepared, and Mr. Westwood considered the process a great desideratum. Mr. Westwood stated that he had received, together with others, a letter from the secretary of the re-union of the Entomologists of Italy, informing them that the meeting for the present year will take place at Florence, com-

[* The date of 1840, was a misprint for 1804. We have received a communication from A. B. to correct the error.]

mencing on the 15th September, and terminating at the end of the same month. A very splendid collection of insects from Manilla, &c., was presented by Mr. Cumings, who has recently returned from those parts with rich stores for the naturalist. A special vote of thanks was returned for the liberal and very splendid donation. Mr. Westwood called the attention of the society to a peculiar larva (caterpillar) from China, (presented by Mr. Reeves,) which has long been considered of great efficacy as an effectual remedy in disease; it is exceedingly rare, and is only prescribed for those in the employ of the Emperor, at his palace. It is very undecided in its nature, at least as recorded by the native physicians, who are inclined to believe that it is a vegetable at one period of its existence, and an animal at another: the fact is, it is a caterpillar, out of which grows a parasitic fungus, which is invariably found to proceed from the back part of the neck. They are tied up in little bundles in China, and bound with red tape. The people describe it as being a herb in the summer, which changes in the autumn into an insect. It is a very great rarity at Pekin, and grows at Thibet; its virtues are reputed to be to a certain extent those of *ging-seng*, but does not produce hæmorrhagy, while it restores the strength of the patient. Five drachms of it are recommended by the native doctors to be put into the interior of a tame duck, and boiled for a short time, when it is fit for administration. A letter was read from Mr. Walker, received for Dr. Cantor of Calcutta, in which it was stated that he had made good collections of fish, mollusca, and zoophytes.

Mr. Hope proposed in his anniversary address to form committees to investigate and report on the entomology of different regions. Some notes made by Mr. Hope were merely read as a notice, and the several committees nominated to look into the matter

Mr. Westwood then read the completion of his memoir on the Linnæan family of *Staphylinidæ*.

SOCIETY OF ARTS FOR SCOTLAND.

At a recent meeting of the above society for Scotland, the president read an interesting account of a series of extensive experiments "On the Evaporating Power of various kinds of Coal," (including the anthracite), as obtained by combustion in furnaces. The general result of these experiments seemed to be that the practical heating power of all coals is almost exactly in proportion to the quantity of fixed carbon; there appearing to be no heat whatever procured from the volatile matter of the coal. This circumstance Dr. Fyfe accounted for by supposing that the hydrogen and volatilised carbon abstract, in passing to the gaseous state, as much heat as they develop during combustion.

Mr. Sang drew the attention of the society to an erroneous deduction drawn by the late Capt. Henry Kater, from his experiments on *the flexure of bars.* Capt. Kater had observed that the elongation of the distance between two marks on the surface of a bar when the bar is supported at the middle, is hardly half of the contraction caused by supporting the same bar at the two ends (the mere reduction on account of curvature having been allowed for in both cases). And he had thence concluded that the neutral plane is not, as is usually supposed, in the middle of the thickness of the bar, but only at one-third of that thickness from the convex side. Mr. Sang showed that this result would imply that bodies resist distension with eight times the energy with which they resist compression: and he pointed out that the disparity observed by Capt. Kater is due to the difference of curvature in the two states of the bar, and that that disparity agrees with the deduction of the ordinary theory of flexure. He also pointed out some errors in Capt. Kater's methods of computation and experimenting, which seemed to him to destroy all confidence in any of that philosopher's experimental results.

LITERARY AND PHILOSOPHICAL SOCIETY OF ST. ANDREW'S.

At a recent meeting of this society Sir David Brewster communicated a brief abstract of his observations on the polarising structure of the atmosphere. In the year 1812 he discovered the general fact of the polarisation of the light of the blue sky, of clouds, and of the rainbow, and published an account of his observations in his treatise on new philosophical instruments. Since that time M. Arago discovered that there was a neutral point in the sky about 30 deg. above the point opposite the sun, where the light was not polarised; and M. Babinet has more recently (in 1840) discovered that there is another neutral point about 25 deg. or 30 deg. above the sun itself. Sir David Brewster, however, has found that there are four neutral points in the atmosphere—a third being as far below the sun as M. Babinet's point is above it—and the fourth being as far below the point opposite to the sun as M. Arago's point is above it. He was led to these results in consequence of observing the remarkable fact, that the light on one side of each neutral point was polarised in a plane opposite to that of the light on the other side, and that all the phenomena arose from the existence of two opposite causes, one of which polarised the sun's light by reflection, and the other by refraction—these causes compensating or neutralising each other by equal and opposite actions at the four neutral points which are moveable within certain limits. The predominating influence is, in a serene sky, that which polarises by reflection; but Sir David has found that in other states of the atmosphere, this influence is sometimes exactly counteracted by the opposite influence, and sometimes more than counteracted, so that the polarisation, even in the zone of 90 deg. from the sun, is opposite to what it is in a serene sky.

Sir David read a letter from W. J. Broderip, Esq., vice-president of the Zoological Society, mentioning a very remarkable property possessed by certain land shells, viz., the Helix pulcherrima (Young), the Helico-bulinus (Broderip), the Bulinus fulgetarum. Upon immersing the shells in water, the white parts of the pattern almost entirely vanish; and when the shells, after having been well saturated, are withdrawn from the water, the pattern gradually re-appears as the shell dries, till it is as perfect as it was before immersion. Mr. Broderip sent several specimens of those interesting shells, for optical examination, to Sir David Brewster, who found that the pattern existed only in the epidermis, the white parts of which absorbed water and oils, like tabasheer and certain other siliceous bodies; and again discharged the water from its pores when it became dry. The epidermis, when saturated with water, became transparent; and as the coloring matter of the shell was seen through it in this state the white pattern almost wholly disappeared. When the pattern became dry, the light incident upon it was reflected at the surface of its pores, and it again became white, the pattern appearing dark when seen by transmitted light. When the pattern is made to absorb oils or thin varnishes, which do not evaporate, they may be permanently obliterated.—The species possessing this curious property all lie in deep forests, and were taken on the leaves of trees. They form part of a large collection formed by Mr. Hugh Cumming, in the Philippine Islands, and containing upwards of two thousand new species and varieties.

ON THE ADDITION OF BRANDY TO WINE.

BY PROFESSOR BECK.

An opinion has been recently advanced, that the large proportion of alcohol which some wines contain is due to the addition of brandy to the *must*; and it has even been maintained, that, without such addition, wines speedily undergo the acetous fermentation, and thus lose their peculiar flavors. These opinions, if correct, must render quite fallacious the results of the analyses of the older wines, and they deserve therefore to be carefully examined.

In regard to this point, I avail myself, in part, of the information contained in the excellent treatise on Domestic Economy, by Mr. Donovan.—(*Lardner's Cabinet Cyclopedia.*)

Brandy is not added to wines in France or Germany; the finer wines, claret, burgundy, and hock, are said to be totally destroyed by it. But the practice is quite common, nay, almost universal, in the wines of Spain, Portugal, and Sicily, which are intended for foreign markets. The reason of this I apprehend is, not that the wines cannot be kept without such an admixture, but that these strong wines are in great repute, and perhaps also, that, with the addition of brandy, less care is required in preparing them for exportation.

That wines may be kept for a great number of years without the admixture of brandy is evident from the age of many ancient wines. Horace speaks of wine that is nearly 70 years old; and the Opimian wine, which had been made in the time of the Consul Opimius, was 200 years old. In order to preserve their wines to these ages, the Romans concentrated the *must* or grape juice of which they were made, by evaporation, either spontaneously in the air or over a fire, and so much so as to render them thick and syrupy.

This process of evaporation, however, was by no means necessary to their being preserved; for wines not treated in this manner have been known to keep equally long. We are informed by Neuman, "that the tartish German wines keep the longest of any; some of them have kept 200 or 300 years; and in Strasburgh there is a cask 400 years old, and many of them above 70; the wine being occasionally racked off into smaller casks, that the vessel may be continually full. These very old wines are preserved rather for curiosity than use, as they not only grow too strong for drinking, but at last quite disagreeable.

The preservation of wines for so long a time, when the process of distillation was still unknown, and in cases where no brandy had been added, as in the German wines referred to by Neuman, seems to prove conclusively that the admixture of brandy, or other distilled liquor, is not necessary to effect this object. Nor is it probable that the strength of the wine is much influenced by the brandy, as ordinarily employed. The pure juice of the grape, after a few years, becomes fully as alcoholic as those wines which have been brandied. Mr. Brande procured Port wine, sent from Portugal for the express purpose of ascertaining how long it would remain sound without any addition whatever of spirit having been made to it, but it did not differ materially in the proportion of alcohol from other kiuds. Moreover, the raisin wine, which had been fermented without any addition of spirit, contained a larger amount of alcohol than any other wine on his tables.

As the alcohol in natural wines is the produce of the sugar contained in the grape, if any part of the sugar escapes decomposition, the wine will contain alcohol and unaltered sugar, and will be *sweet.* Now, in those grapes which contain a larger proportion of sugar, and in which there is a sufficiency of yeast present to decompose it, there will be a superabundance of alcohol; but the alcohol thus formed stops the fermentation; and the same effect is also produced by the admixture of brandy or spirit.

On the contrary, when the relative quantities of yeast, sugar, and water are such as will conduce to a perfect attenuation, the fermentation will proceed until the whole of the sugar is converted into alcohol. The result under such circumstauces will be a full bodied, spirituous, sound, and, as it is technically called, a dry wine. The addition of alcohol, during the fermentation of the *must*, therefore, is to be conducted upon fixed principles, and with a strict reference to the deficieucies in the ingredients of the grape. An indiscriminate admixture of spirit, either during the fermentation or after the process has ceased, would be attended with hazard to the flavor and value of the wine.

It follows, from these remarks, that alcohol is generated during the process of fermentation, and that its amount depends upon the proportion of saccharine matter in the grapes, and that when all the ingredients are in due proportion the most sound and spirituous wines are obtained; that, when this is the case, the wine may be preserved for any length of time, without the addition of spirit in any form; and that when this addition is made it is only for the purpose of supplying deficiencies in

the *must*, or, in other words, to bring the wine to that degree of strength which it would naturally have attained if all the ingredients of the *must* had been in such proportion as to effect a perfect attenuation."—*American Journal of Science and Arts, Vol.* 28.

ENGINE-DRIVERS ON RAILWAYS.

(*From the Civil Engineer.*)

The late accidents on railways, and the unfortunate loss of life which has occurred in many cases, have naturally directed public attention more forcibly towards providing some efficient remedy against their recurrence; for although it is very true that the accidents frequent by the former method of conveying the public by coaches were, for the most part, attended by a much greater proportionate loss of life than bas occurred on railways, we naturally expect that the talent and expenditure employed in completing tbese undertakings would have obviated such calamities by foresight and arrangement; and in confirmation of the justice of this opinion, it is further remarkable that accidents, till recently, have been very unfrequent, and seldom attended by loss of life. Many railways were opened during the past year, and their want of organization may have tended to cause irregularity. We may also be allowed to entertain an opiuion tbat previous success on older railways has caused, in some degree, a relaxation of care on the part of those entrusted with the management of new ones, both in the selection of proper officers, and in carrying out the recommendations of those professionally engaged in the practical detail, so as to effect that uniformity of action throughout the entire establishment which is necessary to insure success. In the management of a railway, as in that of the army, it appears necessary that business should he conducted by a head manager, deriving his authority and receiving instructions immediately from the board of directors, having under him gradations of officers, who should be beld responsible for the due performance of the duties of themselves and their subordinates, and have the power of appeal to the board of directors in cases of dispute; they should also he protected from the individual interference of receiving orders from any other than tbeir superior officer in each department respectively, and these superior officers from the mauager as tbe official organ of the directors.

It may he argued by many, that such an arrangement as we propose would open a door to abuse of power by the superior officers and manager, but a determination on the part of the directors to maintain order and gentlemanly feeling among them, by considering with impartiality and minuteness every case of appeal brought under tbeir notice, and hy reprimanding the delinquent, however high his station, would effectually curb any such evil.

The responsible duties of the engine-driver conducting each railway train, bave marked him out as the peculiar object of public inquiry and censure, and it may be naturally assumed as unfortunate that these men bave risen in many cases from classes uneducated, so far as book learning is concerned. The knowledge of reading and writing, no doubt, gives man a moral standing and feeling of confidence tbat can be acquired in no other way; but we by no means admit that engine-drivers are uneducated for the duties required of them, after having undergone a practical apprenticeship for many years as assistants on the engines they emulate to conduct, and being entrusted with their care after proving themselves sober and attentive servants.

Men educated in the theoretical knowledge of the laws of latent heat and expansion of fluids, would, we think, be quite unable to conduct an engine ten miles without an accident, unless they were practically initiated in its management by serving an apprenticeship to the more menial duties; and it is very doubtful how far he would exercise the continued watchfulness and caution necessary, if the sense of danger were removed by too much confidence in the efficiency of an education such as has been proposed by sending them to institutions for acquiring this knowledge.

Of the many accidents which have lately occurred on railways, we think that there has been a prevalent want of system in giving signals, as well as disregard of duty in not exhibiting them. To render signals efficient, they should be conducted with the *greatest simplicity* as well as certainty, and where many signs are sought to be conveyed, as proposed by the Railway Conference, there is great danger of an improper one being used. Where a signal of danger becomes necessary, it must generally occur from irregularity or accident, and we think the railway system will not be complete until provided with a ready means of immediately transmitting information to every part of the line, as by telegrapb. This has been adopted on a short line in the metropolis on the electro-magnetic principle with eminent success; indeed we doubt if the business could be conducted with safety unless provided with such an instrument; an efficient means of communication is also required between the guards and engineer of the train, to give information of any accident that may occur to a carriage or otherwise.

Engine-drivers are, however, placed in so important a relation to the safety and proper conduct of railway trains, that it has become a serious necessity, felt alike by the proprietors of railways and the public, that they should become or he chosen from a superior class of operatives, and it is their position to which we wish to call more immediate attention. To attain this object it is indispensably requisite that their moral conduct and emulation in the skilful discharge of their duties should be fostered by the due consideration of their superior officers and employers, and that they should be carefully protected from interference or injustice when acting with propriety. As a reward for merit, we should recommend an honorary, rather than a pecuniary consideration. A medal, we think, would prove a more certain inducement, from its heing, *sui generis*, a certificate of good character.

By law, engine-drivers of railway trains have not hitherto been contemplated as a distinct body, nor have their duties and responsibilities been defined, except in general acts relating to all servants of railway companies, and it is to this point we think the attention of the legislature may be directed with peculiar advantage. In case of accident occurring from negligence, it is of vital importance to the community at large that at any rate tbe delinquent should not again he suffered to risk the loss of life; the mere punishment by fine or otherwise is not enough to protect the public; and no combination of the railway interest to denounce the man as unfit for the trust is sufficient to meet the case, for unless the delinquent has been condemned by an impartial judge, fully competent to understand the case, it remains uncertain if he or some other have been guilty of the offence, and opens a door to persecution, which will effectually prevent men of honorable intentions from accepting duties of so arduous a nature. It is therefore as necessary that they should be protected from injury when discharging their duties with fidelity and care, as that they should he punished when the reverse obtains, and to attain this object we should propose that men in this occupation be governed by laws in some measure similar to those enacted for the observance of pilots, to whose duties as conductors and guardians of life and property they approximate more nearly than to any otber.

For this purpose it will be necessary to institute a corporation similar to that of the Trinity House, whose duty and responsibility it should be to examine and grant licences to proper persons for the conduct of railway engines, and to make bye-laws for their regulation, and enforce them after approval of the Privy Council, which bye-laws should he publicly exhibited for the inspection of all persons interested therein, for at least three months previous to heing enforced. In carrying out tbe intentions of a new act of this description, it would he necessary to allow some latitude in the granting of licences to those who are at present engaged as engine-drivers. In future, however, those entrusted with the charge of engines might be divided into three classes, viz., 1st, engine-drivers; 2d, engine-drivers or stokers; aud 3d, apprentices; the two former should always accompany the engine, and perhaps the apprentice also, whose instruction should, however, in part consist of mechanical knowledge acquired in the workshops; as fitter each man should derive his authority to act in either capacity by licence, stating the grade to which he belonged, granted after due examination and certificate on oath of the examining officer, which licence should he renewed every year. Each apprentice should serve five years before he becomes eligible to receive a licence as second engine driver, and each second engine-driver should further serve three years hefore be is entrusted with the entire command of an engine as first engineman, when he should execute a hond for securing obedience to the bye-laws. An annual premium should he paid for each licence, to defray the expenses of carrying out the act, and tbe surplus be carried to a fund for superannuated and infirm drivers, which fund should also be provided for by a per-centage of (say) sixpence per pound retained from their earnings when employed. All appointments should he registered. Licences should be revoked, annulled, or suspended by the engineer-in-chief, and those suspended may appeal to the corporation.

SCIENTIFIC MEMORANDA, AND NOTES ON ART.

The Royal Academy of Sciences of Hungary at Pesth has unanimously elected M. Mark Gabriel Bloch, a Jew, to supply the vacancy which recently occurred in the section of history and philology. M. Bloch is a young linguist, who has become favorably known in Hungary by the translation of the Bible, with notes and commentaries.

Chemical Discoveries.—The important class of *Amides*, which has received so many additions in the laboratory of Giessen, has been further increased by the discovery of two novelties.—*Succinamide* has been discovered by M. Bökman. It possesses the composition of anhydrous succinic acid, in which one atom of oxygen is replaced by an atom of amide, its formula being $C_4H_4O_2 + Ad$. It is formed by digesting succinic ether in ammonia.—*Fumaramide*, discovered by M. Hagen, is formed by acting on fumaric ether with ammonia. Its formula is $C_4H_2O_2 + Ad$. It is not very soluble in water, but is soluble in alcohol and ether.—*Athenæum.*

New Acids from Castor Oil.—Mr. Tilley, of Edinburgh, has ascertained that by treating castor-oil with nitric acid a volatile oily acid is formed, similar in its smell to butyric acid. It is slightly soluble in water, and forms, with barytes and similar bases, soluble salts, which crystallise. During the continued oxidation of the castor-oil there are formed suberic, oxalic, and some other acids; and when the action is completed there remains what is supposed to be œnanthic acid. The author is prosecuting his investigation.

Camphoric Acid.—Wydler and Keller have proved that what was supposed by Berzelius to be an intermediate compound between camphor and camphoric acid is merely a mixture of the two bodies, from which the camphoric acid is separated by bases. They also found the analysis of *sulpho-camphoric acid*, by Walter, to be incorrect. It contains the elements of *hyposulphuric acid.*

Conversion of Malic into Fumaric Acid.—Hagen has ascertained that, at the temperature of 300 deg. C., (572 deg. Fah.), malate of lime, by losing water, is converted into fumarate of lime, forming compounds analagous to *pyro* and *meta-phosphoric acids.*

The German Universities.—The *Constitutionnel* publishes the following statistics of the German Universities:—Berlin contains 1,678 students; Munich, 1,371; Leipsic, 935; Tubingen, 739; Gottingen, 704; Halle, 682; Breslaw, 631; Heidelberg, 614; Bonn, 594; Giessen, 407; Konigsberg, 390; Wurtzburg, 343; Erlangen, 311; Fribourg, 301; Marbourg, 285.

A Prolific Author.—Letters from Vienna state that M. Joseph Aloys Gleich, the most voluminous writer that Germany ever produced, died lately in the capital, at the age of sixty nine. M. Gleich has written two hundred and fifteen romances, the greatest number of which are in two volumes, and some of them in three, in four, and even in five volumes; more than three hundred plays, and many other works of minor importance; without reckoning a long and active contribution to many literary journals. M. Gleich has left a fortune of about 220,000 florins, (550,000 francs), entirely the produce of his literary labours. No other German

author, not excepting even the illustrious Goëthe, has ever acquired such a sum by his pen. The property of M. Gleich will be inherited by his only daughter, who is now engaged in Vienna, as a singer at the imperial and royal theatre of the Porte de Carinthie, and who is married to M. Raymund, likewise a singer and actor in Vienna.

The Duke of Wellington's Statue.—This colossal equestrian figure is rapidly progressing under the hands of Mr. Wyatt. When completed, it is expected to weigh about 50 tons, and to stand about 32 feet from the pedestal. If possible, it is to be formed entirely of the cannon taken by his Grace. The model of the horse, which is about half finished, is very fine. The gigantic animal, with eyes extended and nostrils inflated, is breathing with animation and vigour. The head and boots of the Duke are already cast. The face is an admirable likeness, and is well known to all who had an opportunity of seeing the model of it last year. These parts of the figure, which are all at present completed, have taken the metal of a single cannon. The lower extremites of the figure will be of solid bronze, the thickness gradually diminishing in the upper parts. It is said that the committee have appointed two years as the period in which the work should be completed, 11 months of which have already transpired; but it seems almost premature to fix a time for the finishing so elaborate and gigantic a work, especially when the process of casting is attended with so many risks that may cause a temporary impediment to its progress. During his labors Mr. Wyatt has acquired much valuable experience, calculated to advance the art of casting in metal, among which are a method for testing the tubes which supply the metal, to ascertain that they are perfectly clear, and a plan with the air tubes that causes them not only to expel the air, but also to operate as suction tubes to the metal, and promote its distribution. Another ingenious contrivance is a set of instruments, invented by Mr. Wyatt, for clearing off the metal with infinitely less labor than a common hand-instrument. This Wellington statue, when finished, will, it is supposed, be the largest hitherto known.

Artesian Wells in the Oasis of Thebes.—M. Ayme, a French chemical manufacturer, has been nominated by the Viceroy of Egypt civil and military governor of the whole of the Oasis. This Oasis is twenty three leagues in length, and from two to four in breadth. That of Garbe, where there is also an alum manufacture, is about twenty leagues in extent. These two Oases contain, it is said, some excellent soil, calculated for raising indigo, cotton, sugar, and madder; they are studded with Artesian wells, which have been noticed by Arago. The ancient inhabitants used to dig square wells through the superficial vegetable soil, clay, marl, and marly clay, down to the limestone, from twenty to twenty-five metres in depth. The last rock contains the water which supplies the wells, and is called by the Arabs *Agar el moya.* In the rock, holes were bored from four to eight inches in diameter. These holes were fitted with a block of sandstone supplied with an iron ring, in order to stop the supply when there was danger of inundating the country.

Sir Astley Cooper's Museum.—This eminent surgeon has bequeathed his anatomical museum and the whole of his private papers to his nephew, Mr. Bransby Cooper, the lecturer on anatomy at Guy's Hospital. Among the latter, a memorandum has been found in the handwriting of the deceased, reiterating the wish he had repeatedly expressed when living, that if memoirs of his life were ever to be given to the world they should be written by this gentleman.

Zoological Society.—A meeting of this society for general business was held on Thursday. From the report of the council it appeared that the receipts in February last amounted to £641 1s., which, with a balance of £1,373 6s.6d. from January last, made a total of £2,104 7s. 6d. The disbursements left a balance of £1,258 6s. 3d. The number of visitors to the gardens during February was 1,734, from whom £36 7s. had been received. The menagerie had been increased by a babydrussa hog, two Chinese bonnet monkeys, an Abyssinian sheep, and by several rare and valuable birds. Several presents had also been made to the library.

London Mechanics' Institution.—On Thursday a meeting of the proprietors and members was held in the Theatre of the London Mechanics' Institution, Southampton-buildings, Chancery-lane. The theatre was unusually crowded, as it was expected that six students, who had been expelled for insubordination, would appeal against the decision. Mr. Reader, the secretary, read the sixty-ninth quarterly report of the committee. It appeared that the receipts amounted to £433 11s. The actual expenditure was £243; which, together with the debt from the previous quarter, amounted to £405 12s. The total liabilities (including the building debt of £2,350), were £2,636 5s. The number of members last quarter was 1,019, since then 204 were admitted, and 223 had discontinued; nine sons of members, and eighteen ladies, were admitted; there were then 1,047 members and subscribers, and 187 students; 6 vols. and 10 pamphlets had been presented to the library, and 91 vols. were also presented, having been purchased by the proceeds of a concert given by the members of the institution. The report being adopted, Dr. Birkbeck was re-elected president, and Messrs. Grote, M.P., Ewart, M.P., Clutterbuck, and Sir W. Horton were elected vice-presidents, and Mr. R. Taylor, treasurer. A letter was then read from one of the students expelled, apologising for his misconduct, and praying his name might be restored to the books. On the motion that the decision against the student be reversed, a discussion ensued, when the sentence of expulsion was confirmed by a large majority. Appeals were then lodged by the remaining five students expelled. The students expelled were under eighteen years of age.

Horticultural Society.—The ordinary meeting was held on Tuesday afternoon, Dr. Henderson, vice-president, in the chair. A communication was read from Dr. Horn, on a simple mode of destroying slugs by galvanic action, consisting merely of a plate of copper and zinc in contact, and which was found very destructive to them when they touched either. The show of flowers was very good, amongst the most prominent being a collection of hyacinths in pots, planted in charcoal and sand, which had been watered by solutions of different salts of ammonia and other salts. Those bulbs which had been supplied with distilled water flourished well, whilst all the others were stinted in the growth of their flowers or leaves, showing that this bulb does not improve under artificial treatment.] The only fruit exhibited consisted of some fine lemons from Mrs. Harwood, and some of the physalis edulis from Mr. George Dowdeswell.

Linnæan Society.—On Tuesday evening the ordinary meeting of this society was held, Edward Forster, Esq., in the chair. A communication was read by Hyde Clark, Esq., in which he described an apparatus invented by Mr. Payne, for the preservation of specimens of natural history. It consists of a cylinder or receiver, into which the object is to be placed. The air is then exhausted by an air-pump, and a cock opened communicating with a vessel containing an antiseptic (any may be used), which, on being admitted, penetrates even to the marrow of the bone, and the specimen is thus preserved with far less trouble than by the usual method. A paper was read from Mr. Myers, being a description of a new genus of plants found in the Brazils. Dr. A. C. Cooke and T. Stevenson, Esq., were elected members, after which the society adjourned.

VARIETIES.

A gentleman in Stirlingshire, in the year 1811, purchased a property in the parish of New Monkland, Lanarkshire, for which he paid £460; and, in consequence of the railway which was lately carried through in that quarter passing in its immediate vicinity, he has now, in 1841, got an offer for the ironstone alone in it at the rate of £100 per acre, which, as it contains 16 acres, makes it worth £1,600, exclusive of the value of the coal and the land itself.—*Stirling Journal.*

Extraordinary Effects of a Hurricane.—The *Courrier Suisse* asserts that a woman was caught up by a hurricane in the canton of Uri, one day last month, and carried through the air a space of two leagues. Her body was found some days after, with all her bones broken.

Pirating a Label.—In the Vice-Chancellor's Court on Monday an injunction was granted *exparte* on behalf of Mr. Davis, a dealer in olive oil, in Leadenhall-street, to restrain Mr. Bryant, another dealer, from pirating a label which the plaintiff pasted on his bottles to designate the character and place of manufacture of his oil, which was chiefly supplied to the India market. It was stated in the affidavit that the plaintiff first became acquainted with the alleged fraud by a note from an engraver, who was an entire stranger to him, stating that the engraved plate for his labels required touching up, and, being very much astonished at the communication, he called upon him, and discovered that a fac-simile of his own plate was in the engraver's possession, which belonged to the defendant, and, moreover, that he had a son engaged in the oil trade in India, for whom no doubt the labels were intended.

Shipment of Horses to France.—The Dover steam-packets have, for some weeks past, been busily engaged in transporting large supplies of horses for the French cavalry, agreeably to contract.

Coal Pit Accident.—On Monday, an explosion of fire-damp took place in the coal-pit at Keppoch-hill, when two young lads were killed on the spot, and another so dreadfully burned, that after lingering till Sunday last he expired. —*Glasgow Chronicle.*

Furnace Accident.—An accident of a very serious nature, and which might have been attended with a fearful loss of life, occurred at Newland Furnace works, on Tuesday. The workmen were just about to "tap" the furnace, when it suddenly burst, and the liquid metal rushed out with dreadful force, rolling onwards in a flood at least three feet in depth, and setting fire to everything combustible that opposed its progress. The escape of the men (fourteen in number) was almost miraculous. One poor fellow was lying upon a wooden bench, which was set on fire by the glowing metal, before he had the slightest suspicion of his danger.—*Whitehaven Herald.*

Steam Frigate built at New York.—In a week or ten days (says the *New York Herald*) one of the most substantial and splendid steam-ships in the world will be launched in this city. This steam-ship, or steam-frigate rather, is owned by Nicholas, Emperor of Russia. She is of immense size, and has been building since last spring. Her dimensions are as follow:—Length of deck, 220 feet; length of keel, 210 feet; breadth, 36 feet; full depth, 24½ feet; tonnage, 1,500. She is constructed of live and white oak, but mostly of the latter kind, weighing, we believe, about fifty pounds to the cubic foot. She will draw, when launched, ten or eleven feet of water, and no more. But when her engines, and boilers, and guns, and all her machinery and her fuel, (of which she can carry about eight hundred tons,) are in, she will probably draw five feet more. The model of this great war-steamer was drafted by two officers of the Russian Navy. But of the steam-frigate—no vessel of the kind that has ever crossed the Atlantic is like her. She is superior to the *Western*, the *Queen*, and the *President* (!) Her bows are sharp—her stern is round—her bend is gradual and symmetrical—her wheel-houses are neat, and not too large, and her whole appearance is rich, attractive, and man-of-war like. She has three masts, which, together with her rigging, are very light. This will contribute, in a great degree, to her speed against head winds. Her internal arrangements will be neat, chaste, and beautiful. Her armament is to be very formidable. She will discharge at every broadside more than four hundred pounds of shot! She will mount sixteen fifty-four and thirty-two pounders on the second deck, and two ninety-six pounders hollow shot, called by the humane, death-dealers, on the upper deck, which is flush fore and aft—a clear run of two hundred and twenty feet. Her engines will be about six hundred-horse power. They will be equal to the ship, for no expense is to be spared in having them perfect.

Thames Tunnel Company.—On Tuesday, the annual meeting of the proprietors of this company took place at the London Tavern, Benjamin Hawes, Esq, in the chair. From the report it appeared that this stupendous work is now nearly finished, the tunnel having been brought to within twelve yards of Wapping High-street. The footway descents to the tunnel, on the Wapping side, are expected to be finished by the middle of the present year, and by the end of the year it is expected that the company will be in the receipt of toll from passengers. The length of the tunnel at present completed is 1,140 feet, and the foot passengers' shaft is sunk to a depth of 23 feet, 50 feet being the depth required. The number of visitors last year was 34,000, being 3,000 more than in the year preceding, and the amount received from them was £1,700. The balance sheet showed a sum in hand of £14,000. Mr. Brunel explained briefly the difficulties he had had to contend with in sinking the shaft on the Middlesex side of the river, and remarked that there was now no doubt of the full completion of the work, which would last for ages. Notwithstanding the influx of the Thames into the works, not a fracture or a settlement in the work of a hair's breadth had taken place. The workmen had had to contend with fire as well as water in the progress of the works; still since the resumption of the operations only one man had lost his life. Frequently the men had to be carried out senseless, owing to the gas that was generated in the progress of the works; but all difficulties had been overcome, and in the present year the Tunnel would be completed. It appeared that the total cost of this undertaking to the present time is about £400,000, including the Government grant, and that it si likely to be finished for less than half a million. The report was adopted unanimously.

Explosion.—On Monday, about twelve o'clock, a very alarming explosion took place on the premises of Mr. Hooper, Surgeon, London-road, Southwark. During the absence of Mr. Hooper, his assistant was preparing a quantity of elder ointment in a large earthenware pipkin, over a small fire in the shop. Whilst so employed the preparation ignited, the effect of which was so violent that the whole frontage of the shop with the contents of the shelves was blown into the street. Other parts of the shop were also greatly injured, scarcely anything in it escaping the shock.

Postage.—The new postage law has not worked well in Ireland. By a late return the net revenue for 1840 was—in Great Britain £441,000, Ireland £6,664—£447,664. This is the clear revenue, or the money paid into the Exchequer. On looking back to the accounts for 1839, we find that the net revenue was—in Great Britain, £1,519,000, Ireland, £107,298—£1,626,298. In Britain the Post-office under the new law has yielded 29 per cent. of what it yielded under the old. In Ireland it has fallen to 6 per cent.; and this was perhaps to be expected. In Britain, and under the old law, the charges of management absorbed only about 30 per cent. of the gross receipts; in Ireland they absorbed 51 per cent. In Britain the great amount of business, and the wealth and numbers of the middle classes, ensured a great increase of correspondence; but the opposite circumstances of Ireland left small room for such an increase there.—*Scotsman.*

EASTERN COUNTIES RAILWAY.—The public are respectfully informed, that on and after Monday next, the 8th day of March, the TRAINS will RUN as follows :—

From Shoreditch to Brentwood.		From Brentwood to Shoreditch.	
Morning,	½ past 8 o'clock.	Morning,	¼ to 9 o'clock.
..	11 ..	..	¼ to 10 ..
Afternoon,	2 ..	..	¼ to 11 ..
..	3 ..	..	½ past 12 ..
..	4 ..	Afternoon,	½ past 3 ..
..	5 ..	..	½ past 5 ..
..	½ past 6 ..	..	½ past 6 ..
Evening,	¼ to 8* ..	Evening	¼ to 8* ..

* From May to September inclusive.

Offices, High-street, Shoreditch, March 2, 1841.

WEST LONDON RAILWAY COMPANY, Birmingham, late Bristol and Thames Junction Railway Company.—Notice is hereby given, that the tenth Half-yearly General Meeting of the Proprietors of the West London Railway Company will be held, pursuant to the Act of Parliament, at the office of the Company, No. 11, Abchurch-lane, in the City of London, on Tuesday the 9th of March next, at 10 o'clock precisely, for the election of three Directors, in the place of two Directors who will go out of office by rotation, and one Director who has resigned, and for other purposes.

WILLIAM MORGAN, Deputy Chairman.

RICHARDSON and BRAITHWAITE'S TINNING PATENT, for CAST IRON and other METALS.—The eminent firms of Messrs. W. Bullock and Co., and Messrs. Kenrick, of West Bromwich, Staffordshire, the great manufacturers of hollow ware, having taken licences for the use of it. It is also the only mode of re-tinning culinary utensils which is permanent.—Samples may be seen and licences granted at Mr. G. M. Braithwaite's, White Lion-court, Cornhill; or at Mr. Bachelard's Patent Cork Stuffing office, 10, Warwick-court, Gray's-inn.

NEW LABEL.—In consequence of the great variety of Counterfeit Wrappers of "ROWLAND'S MACASSAR OIL," now in circulation, and which so nearly resemble the Original as frequently to deceive the unwary—the Proprietors, acting under a sense of duty, and regardless of expense in the attainment of their object, the protection of the Public from fraud and imposition, have employed those celebrated artists *Messrs. Perkins and Bacon*, who have succeeded in producing "A NEW LABEL" from steel, of so complicated and intricate a nature, and of such excessive difficulty of execution, as to amount to an impossibility of imitation, and to be considered by connoisseurs a Masterpiece in the art of Engraving.

The Label forms a combination of beautiful designs—a portion encircling a BUST of Her Majesty the "Queen"—which surmounts the words, in two lines,

ROWLAND'S
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the ground work is composed of the most elaborate and chaste patterns of lace work. Under which are the Signature and Address of the Proprietors, in *red*,

A. ROWLAND & SON, 20, Hatton Garden, London.
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THE

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AND JOURNAL OF INDUSTRY;

A WEEKLY BRITISH AND FOREIGN MISCELLANY OF

SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

No. 85.] SATURDAY, MARCH 13, 1841. [PRICE FIVEPENCE STAMPED. CIRCULATING FREE BY POST.

RECIPROCATING AND CRANK ACTIONS.

The recent article in our journal on reciprocating and rotary steam-engines* has, we are glad to find, provoked discussion on the merits of the two principles. One letter on the subject, from a civil engineer, is inserted this week, in which he supports the reciprocating action, and contends not only that there is no power lost thereby, but that all rotary motion may be resolved into reciprocating; and consequently that no possible advantage could be gained by rotary engines, supposing even means could be contrived for giving a direct rotary action without any waste of steam power in the application. The question is one of great interest, for if this opinion be correct, and can be well established, the numerous efforts that are still making to produce direct rotary movement by the pressure or impulsive force of steam are labor in vain. We must observe, however, that our correspondent seems to have misapprehended the view we took of the subject. Our objections to reciprocating engines were directed principally to the loss of power in communicating motion by the crank; for we stated that when steam-engines are worked expansively, and the quantity of steam employed is properly adjusted, "the loss of motion may be much reduced, if not altogether compensated." This, however, excepting in engines of slow movement, can be scarcely ever accomplished, and unless this be done, there must be a constant loss of motion.

To enable a reciprocating steam engine to work without any loss of power by the *reciprocating action,* it is necessary that the whole momentum each way be exhausted by the time the piston arrives at the top and bottom of every stroke. With beam-engines this is next to impossible; for the momentum of the heavy moving beam must be stopped, and a new motion given to it, at the end of each stroke. It matters not whether the motion communicated to the beam be caused directly by the force of steam on the piston, or whether the motion be continued by the reserve power in the fly-wheel; in either case, the motion of the beam upwards and downward must be stopped and reversed at each stroke of the piston, and this, we contend, cannot be done without a loss of power.

Let us suppose, for example, that it were possible suddenly to disconnect the beam from the fly-wheel, and all the machinery, the instant that the piston arrives at the top of the cylinder. The beam would, in that case, continue to move on its bearing in the same direction and with the momentum (communicated to it either by the fly-wheel or the piston-rod) which it possessed at the instant the connection was severed. This momentum, whatever be its amount, is therefore not only lost on the working of the engine, but power must also be employed and wasted to act against it, and to reverse the motion. In common beam engines, with one cylinder, it is impossible to avoid this loss and waste of steam power by continually stopping the motion of the beam, because the fly-wheel must have a sufficient reserve of power to carry the crank round the dead points. The whole momentum cannot consequently be exhausted by the time the piston arrives at the end of the stroke; which we have stated to be an essential condition to the action of a reciprocating engine without loss of power by reciprocation.

When the piston rods of two cylinders are connected to the same crank-shaft as in marine engines, and no beam or fly-wheel is employed, it may be practicable to avoid much loss of momentum or waste of power by reciprocation. As the cranks are placed at right angles, so that the one acts with best effect when the other comes to the dead points, there is no necessity to have a reserve of power to carry the crank round. In this case, therefore, it is *just possible* so to regulate the supply of steam to each cylinder that the whole impulse of the steam admitted shall be exhausted at the moment the piston reaches the end of the stroke each way. If this could be done, there would then be no loss of power from reciprocation, because the whole momentum, upward or downward, would be exhausted before the new motion was communicated.* But to produce this effect it would be requisite that the beam, if there be one, and all the other reciprocating parts of the machinery, should be gradually brought to rest before the new motion is given. This is never done, and it is scarcely possible it ever can. Therefore, even in this most favorable view of the action of reciprocating steam-engines, there must, almost of necessity, be a considerable loss of power by stopping and reversing the motion. In locomotive engines on railways, especially when they are worked with full pressure steam throughout, the loss by the reciprocating action must necessarily be still greater, owing to the rapidity of the motion of the pistons. In those instances the whole momentum given to the rapidly-moving piston is checked and lost, and though there may be little actual waste of power in bringing it to rest, as in beam engines, the rapid transition from rest to motion must occasion a serious waste of power by reciprocation, which would be avoided could a continuous motion be communicated by the direct action of high pressure steam.

The loss of power in the communication of motion by means of the crank, which is an almost indispensable appendage to reciprocating engines, is, we are surprised to find, disputed. The question does not lie now between the crank and any other means of transmitting motion; but, granting it to surpass all rival contrivances for converting rectilinear into circular motion, is it not attended with great loss of power? The peculiar adaptation of the crank to reciprocating engines, must not be considered when the question involves the merits of those engines, and the disadvantage arising from the necessity of changing the motion. It is a generally admitted fact that loss of power occurs in the transmission of all motion when the direction of the acting force is not a right angle; and that the amount of loss increases as the deviation from that direction increases. In communicating rotary motion by the crank, the force acts at right-angles only at the "dead points," where the action is injurious; and in those parts of the curve described by the revolving crank at which the connecting rod acts with most effect the variation from the right angle is the greatest.

It seems quite clear, therefore, that much of the original force must be wasted by this mode of changing rectilinear into circular motion, as the force is always acting to disadvantage, and the disadvantage increases when it is most exerted. This loss of power is independent of the loss from reciprocating action; and the two combined are operating more or less in all reciprocating steam-engines in diminishing the force employed. Whether the disadvantages can be remedied, or whether it be practicable to obtain a direct rotary motion from steam power, is a separate question. But as nothing tends more injuriously to check the progress of

* Inventors' Advocate, No. 83.

* In this statement of the case we give the reciprocating principle the full benefit of our views respecting the non-existence of "inertia" as a principle of matter, as explained in the 32d number of the Inventors' Advocate.

improvement than the opinion that perfection is already attained, we consider it desirable that the objections to the present application of steam power should be recognised and borne in mind with a view to its more advantageous development.

M. BOUCHERIE'S DISCOVERIES IN PRESERVING WOODS.

At a recent sitting of the Academy of Sciences in Paris, M. Biot made some very interesting observations relative to the last communication of M. Boucherie on the method of introducing different liquids into the fibres of wood, by means of filtration. The object proposed by M. Biot is to make a clear explanation of the science properly so called, and of its application on scientific principles in the history of discoveries. So far as relates to the beautiful experiments of M. Boucherie, it is evident that the first idea, that the scientific experiment, if we may use the expression, is not originally his. M. Biot has satisfactorily explained this historical point of the question. He has demonstrated, that the experiment made by M. Boucherie on this subject, so important to vegetable physiology, had been previously studied by many philosophers, who, by means of the aspirating power of vegetation, had succeeded in impregnating the fibres of the wood with different kinds of liquids, such as water, alcohol, saline substances, &c.

M. Boncherie does not even appear to have given a satisfactory account of the laws of the attractive power in vegetables; he says, indeed, in his papers, that the time when the trees are in full sap is the most favorable to the application of his process, and again he intimates, that autumn is the most desirable season. Now, it is requisite, on the one hand, to understand what is meant by the trees being in full sap, and on the other, nothing can be more variable than the condition of trees in autumn, considered with respect to the liquids they contain, a portion of which they part with on the approach of winter. Thus, in cutting several branches of birch towards the end of October, M. Biot has observed, that in some of them the sap still continued to flow abundantly from the surface that has been cut, while that of others was already in a state of hybernisation and exhausted.

The time for impregnating the fibres of the wood with the liquid required, is not during the continuance of the ascending power, because the fibres are then saturated by the sappy fluid conveyed from the roots into the branches, and from the branches to the leaves.

In order to avoid the inconvenience resulting from the variable condition of vegetation, M. Boucherie made the experiments which were alluded to in the last sitting. He has endeavoured to introduce preservative liquids by means of filtration, by placing them in a sort of funnel at the upper part of the trunk of a tree that has been cut. He has observed the liquids quietly descend into the lower part, after having displaced the sap, which escaped, in consequence of the action of pressure effected on it by the filtering liquid.

But considered in a scientific and experimental point of view, M. Boucherie has been in this proceeding anticipated by M. Biot himself, who since the year 1833 has continued to make similar experiments, which he has exhibited in the Academy; and further, this philosopher at the same time contrived an apparatus adapted to collecting the sap of trees in a state of purity; which cannot be obtained by the process of filtration. In the latter case, indeed, the sap must be mingled more or less with the filtering liquid.

So that M. Boucherie grants either too much or too little to M. Biot, when he says, in his last note, that if this philosopher had continued his researches in this way, he would probably have arrived at the conclusion he announces, before himself. In fact, if the question relates to the practical application of the method of impregnating woods for manufacturing purposes, to the choice of substances adapted to form new combinations with the woody fibres, to preserve the wood from decay, from the action of destructive insects, and to preserve their flexibility, or to ornament them with a variety of colors, for the purposes of the cabinet makers,—these useful and ingenious applications belong, without doubt, entirely to M. Boucherie. M. Biot not only refuses to claim them for himself, but if he had perceived the possibility of these practical applications, he would have contented himself merely with mentioning, and not have pursued them; the nature of his occupations, and even of his tastes, being entirely foreign to all manufacturing processes and speculations. But if this new process is to be regarded as a scientific discovery, in connection with the experiments adapted to its development, M. Biot has on this point nothing to concede to M. Boucherie; provided that his experiments on the filtration of liquids through the woody substance of the branches of trees are as complete as science and theory require. Now if it is right to grant national rewards to men who have discovered the means of making beautiful and important applications of the principles of science, neither must we forget the claims of philosophers who have advanced those principles, and who are satisfied with the honor of having rendered them available by practical men.

M. Gaudichaud read a paper in which he observes that the experiments of M. Boucherie may be considered confirmatory of the system of vegetable development, which it was the object of his labors, so well known in the Academy, to demonstrate. This interesting question so thoroughly investigated by M. Gaudichaud, by means of dissections conceived and executed with so much ability, by which this learned botanist demonstrates the true method of the development and growth of plants and trees, we shall not now enter on, but confine ourselves to stating that the theory of M. Gaudichaud consists in two principal points. According to his theory there are two systems of vegetable development, the one ascending by means of woody fibres rising from the root towards the top of the plant; the other descending, and issuing from the shoots and leaves, whence multitudes of fibres protrude in the form of roots, which descend towards the lower part of the stalk, and soon entirely cover it; in this manner the layers of woody substances are deposited. Hence arise some important physiological considerations which we shall advert to on another occasion. Either of these methods of the formation of wood allow us to conceive how it is possible for liquids to pass through them; and in the experiments of M. Gaudichaud, he also succeeded in making liquid injections, and even hairs, pass up the ascending tubes, and return by the descending passages.—*Journal des Debats.*

RAILWAY SYSTEM OF BELGIUM.

The Minister of Public Works is obliged by the law of the 1st of May, 1834, to present a report to the legislature of the state of the railways during the past season, up to the period of its presentation. This report has been recently presented, and it contains a most satisfactory account of the state of the Belgian system of railways. It appears from this account, that, pursuing the plan of making these great public works national undertakings, at the cost and under the management of the state, has been very successful, for, in addition to the great general advantages which the combined system of railways throughout the kingdom has contributed to produce, the actual receipts are becoming a source of revenue, that will in a few years time, when the railways are in more extended connection with those of Germany and France, become an important addition to the national funds.

By the law of the 20th June, 1840, the total expense of the establishment of railways, decreed by the laws of the 1st May, 1834, and the 26th May, 1837, comprising an extent of 113 leagues, was fixed definitively at 125,664,707 francs. This estimate comprised the amount of the works and the furnishing of the railways, paid up to the 31st December, 1839; and the amount of the works remaining to be done to the 1st January, 1840. A table annexed to the report contains all the expenses of the first establishment, amounting to 77,909,206 francs. On the 1st of January, 1841, there remained to be expended, to complete the system that had been planned, 3,334,500 francs, to finish the sections already completed; 3,778,500 francs, for the requisite materials; and 40,642,500 francs for the sections constructing; making altogether 47,755,500 francs.

The only works which remain to be contracted for, to complete the system decreed by the law, are, —on the south line, the branch from Braine-le-Comte to Charleroy, and from Charleroy to Châtelineau, about seven leagues in length, of which about three or four leagues will be proceeded with directly. On the Flanders line, the section from Templeuve to Tournay, and from Mouscron to the frontier towards Lisle. Also the branches to the docks at Antwerp, the extensions to the stations to the north and south of Brussels, and the approaches to some other towns, which have been nearly arranged.

Considering the completion of the system as certain within the amount fixed, of 125,000,000 frs., we may state the average cost of the whole per league at 999,000 francs; the lowest amount being 615,000 francs, and the highest 2,165,000 francs. This low average cost of construction is considered by the Minister of Public Works as evidence of the advantage of placing the undertaking under the charge of the Government. This, no doubt, has been the means of saving a great deal of money, which in private speculations is thrown away in obtaining acts of Parliament, and in conciliating the landowners; but it must be borne in mind, that the general level nature of the country presents peculiar facilities for the construction of railways.

The following statement of the sums expended in each year will show the progress of the whole undertaking. In 1834, at the expiration of eight months from the promulgation of the law, the expenses incurred were 641,941 francs; in 1835, 4,914,458 francs; in 1836, 13,488,488 francs; in 1837, 26,400,676 francs; in 1838, 40,274,444 frs.; in 1839, 57,284,621 francs; and in 1840 there were expended 20,624,585 francs; which makes the whole, to the 31st of last December, amount to about 78,000,000 francs, expended in less than six years in the construction of railways in Belgium. The number of leagues of railway thus completed amounts to sixty-seven.

The expenses of working the railways, independently of their construction, has amounted, during the six years they have been in operation, to 10,626,477 francs. The number of leagues travelled with the trains in the same period has been 640,000; from which it appears, that the average cost per league of conveying the trains, including all expenses of carriages, repairs of the road, &c. and leaving a reserve of materials, has been 16 frs. 56 c. This is the general average from the commencement, but since the extension of the system the cost of working has diminished; and in 1840, it amounted to only 12 f. 68 c. The total amount of receipts for the six years was 15,193,938 francs. Of course, as the railways in operation extended, the receipts increased, for of the above amount one-third was the produce of the last year alone. The number of passengers, however, did not increase in proportion to the extent of railway communication, owing to the fares having been raised, especially on the wagons, or third class carriages. The fares by the latter conveyance were at first fixed at

12½ c. for 5,000 metres, which is at the rate of about a penny for three miles. When the fares were on this moderate scale, the wagons conveyed three times as many passengers as the two other classes of carriages together, and produced about two-thirds of the total receipts. The number of passengers conveyed in 1828 was 2,238,303; in 1839, 1,952,731; and in 1840, 2,199,319. We thus perceive that there has been a considerable diminution in the number of passengers conveyed since 1828, notwithstanding the subsequent opening of several important branches of communication. The Minister of Public Works disapproves in his report of the advance in the fares, which took place in February, 1839, and recommends reduction.

The conveyance of goods has not yet been brought into full operation. It was not until Augu t last that the administration of the railways undertook to deliver goods sent for conveyance, and until that convenience was afforded the goods sent would necessarily be limited in quantity. The average receipts from merchandise, packages, and cattle, during the latter months of 1840, were 104,000 francs per month.

It appears from the preceding statement of the expenses and receipts, that, putting out of consideration the original cost of the railways, the balance in favor of the Government since May 1835 amounts to upwards of four millions and a half of francs. This, however, is by no means a fair statement of the productiveness of the railways at present, or an indication of the future profits to the state; for during a great portion of that time only a small part of the different lines was in operation; in 1840, for instance, the balance of profit was 2,338,053 frs. or more than double that of all the former years united. This advantage, it must be borne in mind, is altogether independent of the national benefits conferred by the combined system of railways, which has been the means of invigorating the industry of the couutry, has called forth its resources, and added to its wealth in various ways.

The Minister, in the conclusion of his report, observes:—"the impetus is now given; in whatever point of view we regard it, the superiority of railway conveyance over all other means of transport is indisputable. In a short time, branch railways, connecting themselves in all parts with the main-trunk, will constitute a complete chain of communications, and our country, so rich and so industrious, will become but one great workshop for labor, one immense market, and, we hope, one large family, united by common interest and unanimous opinion."

IRON MANUFACTURE IN PENNSYLVANIA.

(*From a Correspondent at Philadelphia.*)

The several Pennsylvanian furnaces in blast with anthracite coal have continued to answer the most sanguine expectations of their owners, improving both in the quantity and quality of the metal. The first furnace built at Pittsville, for the purpose of testing the experiment, has changed hands, and is now in successful operation, using only the coal and ore of that region. Several puddling furnaces are also in operation, giving great satisfaction to their proprietors, and particularly to the laborers who are employed to work them. The saving in the various processes of refining is about 25 per cent., though an exact estimate cannot be made, in consequence of their recent construction. The fact, however, is, that wherever the coal can be procured the proprietors are changing to the new plan; and it is generally believed that the quality of the iron is much improved where the entire process is effected with anthracite coal. The state of our monetary affairs, and the excitement auterior to our presidential election, have retarded the operations we anticipated in the beginning. The suspension of our banks, the non-payment of dividends, with the necessary curtailment of all trades and professions, have so locked up our capitalists that they are really unable or unwilling to look at any project, however brilliant or clear, until the vexed question is settled, and the banks have again resumed their business. This event being now certain, we have every day strong evidences of realising our hopes; and, from the report of this morning, the belief is that the business has begun in earnest. By letters it appears that large purchases have been made in that region, where furnaces and rolling mills are to be immediately commenced, and that the parties have all the experience and capital necessary to the prosecution of the work. This, if true, will turn all eyes to the spot; and, as we have no business that presents so many advantages, we may look for immediate and large operations. The subject of iron already occupies the attention of a very large portion of our citizens; and every day some new object to which it can be applied beneficially, or some new development, is presented to their notice. Yesterday I witnessed an experiment in casting butt hinges, in which the operator made two per minute, and in appearance and strength much superior to the imported article. The importance of this discovery may be inferred from the fact that we import about one million and a half of dollars' worth per annum, and that the workman can produce fifteen to one over the old mode of casting in the sand. He also exhibited sash weights, waggon boxes, &c., which will interfere with if not drive out all that are made on the old plan. By a somewhat similar invention door-locks are made, which promise to supply a large portion of the demand in the United States. But this interference with the imported article is not equal to the many new objects to which iron, when reduced in price, will be applied; and in renewing the subject I am strongly impressed with the belief that the recent developments in the iron trade of our country offer the safest and most sure objects for investment that have yet been presented.—*Morning Post.*

EVERLASTING FIRES.

A paper was lately read at the Royal Irish Academy, by Mr. G. J. Knox, "On a Principle for producing an Ever-burning Flame."—"A belief," he observed, "in the discovery of an ever-burning lamp, appears to have been prevalent in all ages; and tradition informs us that lamps have been found in tombs, where they have continued burning for upwards of 1,000 years, of which mention has been made in the works of St. Austin, Plutarch, Pliny, Ludovicus Vives, Baptista Porta, and Licetus. The Rosicrucians, who laid claim to the knowledge of every thing mysterious, pretended to have re-discovered the secret of their construction, which was supposed to have been buried in the tomb of their founder. Dr. Plott, in a treatise which he has written upon this subject, alludes to a lamp, mentioned by St. Austin in his book de Civitate Dei, which was hung up in the temple of Venus; and to another found in the tomb of Pallas the Arcadian, who was slain by Turnus in the Trojan war, which continued to burn after its removal from the tomb and exposure to the air; proving that these lamps were not supplied from any bituminous source, or volcanic fire. He considers the requisites for an ever-burning lamp to be,—a perpetual wick, which might be made of gold wire, or asbestus; and a perpetual supply of fuel, which he imagines the bituminous springs of Pitchford, in Shropshire, or the inflammable gases issuing from fissures in coal mines, would afford. That such could supply fuel for a flame so long as the bituminous spring existed, or the gas continued to exhale from the mines, is evident; but it no more deserves the appellation of an ever-burning lamp than does a fire arising from any volcanic source. The desideratum for such a lamp is, that it should contain, within itself, a renovating principle, such as, probably, does the luminous atmosphere encompassing the body of the sun, supposed by Sir William Herschel to be electrical. That electricity is the principle upon which such a lamp could be constructed having occurred to me some years ago, I reflected upon the different means by which a constant light could be produced from this source, and concluded that, if by an arrangement of metals a thermo-electric current could be produced of sufficient intensity to decompose water, the heat produced by the burning of the two gases arising from the decomposition would be sufficient, when applied to the alternate metallic junctions, to continue the electrical current of the thermo-electric pile; while the gases, which in burning become aqueous vapour, might be condensed by passing through a long tube, through which, being conveyed to the closed vessel in which the water had been originally placed, they would again undergo decomposition, recombination, and condensation. Such a thermo electric arrangement has been discovered by Professor Botto, of Turin, who has obtained decomposition of water from a series composed of a great number of wires of platinum and iron. To prevent the apparatus from acquiring in time the same temperature, the alternate junctions of the metals, to which the heat is not applied, might be connected with the pedestal upon which the lamp is placed; and the pedestal be either allowed to rest in a cold situation, or else be connected by wires with some extensive cooling surface."

THE HYDRO-OXYGEN MICROSCOPE.

A work has recently appeared, written by a philosophical instrument maker, having the above title. As no mention is made in it of the originators or inventors of this useful application of artificial light to microscopic purposes, we, in accordance with our usual custom of giving merit where it is due, have extracted from the first number of the *Microscopic Journal*, just published, a true and unvarnished account of the application:

"The first and most important attempt to develope to the public gaze the microscope on a large scale, was made by Mr. Carpenter, of Regent-street, who for many years exhibited a solar microscope, for the gratification of the public. The uncertainty, however, of the weather, and state of the atmosphere generally, in this country, and more especially in the metropolis, was the great obstacle to this exhibition. This difficulty, at first sight insurmountable, was at length overcome by Mr. J. T. Cooper, who had for many years applied for private purposes the oxy-hydrogen gases projected on lime, (known generally as the oxy-hydrogen light,) as a means of illustrating in his laboratory and lectures many of the important facts connected with light.

"At a meeting of a few scientific friends to witness the results of some experiments with this light, at Mr. Cooper's laboratory, then at the Aldersgate-street School of Medicine (twelve years since), Mr. Cooper and Mr. John Carey, of the Strand, feeling assured of the principle and stability of the application, proposed to apply this substitute for the solar rays to the illustration of microscopic power, and accordingly arrangements were made, and a microscope constructed, adapted expressly to the peculiar nature of the light, which, as is well known, differs in many respects from that received from the sun. The first microscope (and experimental one) was opened in the Strand in the year 1832, nearly opposite the end of Norfolk-street; this spot was selected on account of the contiguity to Mr. Carey's workshops, as a matter of convenience only. When by dint of much time and experimental application, Messrs. Cooper and Carey had accomplished their labours to their satisfaction, the scientific public, it will be remembered, were invited to attend at 21, Old Bond-street, on the 18th of February, 1833, to witness the first public exhibition of the kind ever presented, in which the oxy-hydrogen light was made to perform all that had hitherto been effected with direct solar light; and it is but justice to those gentlemen to affirm, that this exhibition was considered to be, both by scientific men and the public at large, not only most creditable to the labors of the projectors, but the most interesting and important that had ever been offered to the public, and which could not fail to attract the attention of persons

in every age, rank, and station in life;—but possessing the noble aim of enlarging the views of the multitude, by drawing their attention to the wonderful and beautiful adaptations of nature to secure her ends. No exhibition was for a period better attended than was this. Others in the course of time sprang up in various parts of the metropolis and provinces, and two are even daily exhibited at the galleries of Practical Science in London, forming the leading attraction, and exciting the general interest and amusement of those who visit these institutions."

BRITISH PATENTS.

ENGLISH EXPIRED PATENTS.

Joseph Frederick Ledsam, of Birmingham, merchant, *an improvement for purifying coal gas, by means not hitherto used for that purpose*, March 2.

PATENT NOT SPECIFIED WHEN DUE.

James Bingham, of Sheffield, manufacturer, for *certain improved compositions, which are made to resemble ivory, bone, mother-of-pearl, and other substances, applicable to the manufacture of handles of knives, forks, and razors, pianoforte keys, snuff-boxes, and various other articles*, due March 3.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 149.)

William Daubney Holmes, of No. 5, Cannon-row, Westminster, Middlesex, for *certain improvements in naval architecture, and apparatus connected therewith, affording increased security from foundering and shipwreck*, March 3.—The patentee claims as his invention the following improvements:—

First,—The application of iron stringers or ribs, fixed obliquely to the ordinary angle iron ribs, and fastened to the same.

Second,—The application of diagonal iron framing or trussing, in combination with the stringers and angle iron ribs of iron ships, boats, or other vessels, and also diagonal iron framing or trussing, fixed to the ribs and stringers within the ordinary angle of iron ribs.

Third,—The application of diagonal bracing and trussing to be fixed longitudinally or transversely through the ship or other vessel, or parts thereof; and the connecting of the same to the bulkheads, to give stiffness and strength thereto, and to reduce the strain of the bulkheads on the sides of the vessel.

Fourth,—The construction of an iron beam, by a combination of iron plates and iron trussing.

Fifth,—The construction of a beam, by a combination of iron plates and wooden boards, or planks, not less than three of one and two of the other, laid together alternately.

Sixth,—The construction of an iron beam, by several iron plates being laid and fastened together.

Seventh,—The application of corrugated plates or bars of iron, to give stiffness to the stringers, beams, bracings, trussings, or ribs, in ships or other vessels.

Eighth,—The division of the ship or other vessel into cabins or state rooms, by iron plates or iron frame-work, in combination with wood, papier maché, or other suitable material, which may be used for panels.

Ninth,—The application of layers of several plates of iron and other materials, one over the other, to ships of war and other vessels, for the resistance of shot.

Tenth,—The construction of an arched trussed iron beam, for the support of the planking of the decks.

Eleventh,—An apparatus to represent the undulations or section of the ground over which the ship or other vessel floats.

Twelfth,—The application of the compass or chronometer suspension, for the suspension of berths or cabins.

Thirteenth,—The steering of boats and other vessels by means of reins.

Fourteenth,—The application of an air-tight pipe made of india-rubber cloth or other suitable material, for closing hatchways, or other openings in the decks, or other parts of ships, boats, or other vessels.

We will merely notice the ninth, eleventh, and thirteenth claims, as the others sufficiently describe themselves.

The outer shell of the vessel is formed in panels, and short lengths of plank are extended from the centre of one rib to the centre of the next; over these are placed layers of thinner boards, or planks, or india-rubber, or cork, &c., or other elastic substances, and alternately with these thin plates of iron. These layers are laid in squares, the four corners of four squares meeting over the centre of each panel. The elasticity of this combination will cause the shot to rebound, or direct it through the weakest part, viz., the meeting of the four corners of the squares, by which means the damage done will be considerably less than usual.

The apparatus mentioned in the eleventh claim consists of a long pipe, one end of which is attached to an axle or moveable centre in the bows of the vessel, and the other end passing through the bottom of the vessel terminates in a bulb or hollow ball, which lies on the ground at the bottom of the water. As the vessel proceeds, the ball descends or ascends, a ccording to the elevations or depressions of the ground, and acts upon the axle, which shows on a scale by means of a point the difference of the elevations passed over; or by substituting a pencil for the point, a representation of the undulations of the ground passed over may be obtained on paper.

The steering of boats mentioned in the thirteenth claim is applicable only when two or more boats follow each other. The reins are fastened to levers, which have their fulcrum in one boat, and are united with the other boat by a connecting bar, the lever being so balanced as to fall back when not pulled forward. By pulling one of the reins forward, the space between the boats will be reduced on that side, by which means a curvature in the line of boats is formed, which will direct them to the right or left.

Charles Joseph Hullmandel, of No. 49, Great Marlborough-street, Middlesex, lithographic printer, for *a new effect of light and shadow, imitating a brush or stump drawing, or both combined, produced on paper, being an impression from a plate or stone, prepared in a particular manner for that purpose; as also the mode of preparing the plate or stone for that object*, March 5.—Claim.—The impression, or new effect of light and shadow, produced from a drawing executed as herein described on a plate or stone, prepared for printing by etching after the drawing has been made. Also the preparing the plate or stone, by covering it with any suitable ground that will admit by volatilisation and consequent cracking the action of the acid, for the purpose of etching or biting it. And further, the etching or biting it as herein described.

The stone or plate is first grained as for a chalk drawing, and the drawing made on it with lithographic ink mixed with water, and it is prepared with acid, as is usual with chalk drawings, and well dried. The stone or plate is then placed in a slanting position, and a solution of resin in a volatile solvent poured over the whole drawing. As the volatile solvent evaporates, the resin cracks, leaving the portions of the drawing under the cracks exposed and unprotected. When it is quite dry, the stone is gently warmed before a fire, in order to fix the resin to the drawing; then over the whole surface of the drawing, in order to etch in those parts that are exposed by the cracks in the ground, is poured a strong mixture of nitric or muriatic acid, (or any other acid that will act upon lithographic stones or plates), and gum water, which is allowed to act for one minute. The drawing and ground is then washed off with spirits of turpentine, and the stone is fit for printing.

William Freeman, of Milbank-street, Middlesex, stone merchant, for *improvements in paving or covering roads and other ways*, (communicated by a foreigner), March 7.—Claim.—The mode of paving or covering roads and other ways requiring to be paved or covered, by applying india-rubber combined with saw-dust, sand, or finely-broken stone, and pressed into blocks or slabs, as herein described.

The india-rubber, after being cut into small pieces, is put into an iron cylinder, having a strong axis passing through it with teeth projecting therefrom, and which axis being caused to revolve reduces the india-rubber to a strong pasty state.

A quantity of charred sawdust is now gradually ground in, in order to combine it with the india-rubber, until the mass will take up no more. It is then put into iron moulds of the size required, and submitted to pressure, under which it remains till cool; and the part of the mould that forms the upper surface of the block is covered with a coating of coarse sand, which is forced into the block by the pressure. In place of sawdust, sand or finely broken stone may be mixed with the india-rubber.

The road having been made smooth, the blocks are placed on it (the side that has the coating of sand being upwards), in the same manner as with blocks of other materials, and they are caused to adhere to one another by india-rubber cement.

Thomas Motley, of Bath Villa, Totterdown, Bristol, civil engineer, for *improvements in apparatus and means of burning concrete fatty matters*, March 7.—Claim first.—The applying an auxiliary light under the chamber, for the purpose of rendering the concrete substance liquid, for the object of first lighting the lamp, the auxiliary light being extinguished as soon as that is accomplished.

Claim second.—The applying two, three, or more wick holders, to the outer edge of the chamber, with circular, half round, or oblong air shafts, on the inside towards the chamber.

Claim third.—The plan of attaching a small plate over the air shaft, which the patentee terms a liquifier or heat communicator.

The lamp for burning the fatty matters is provided with a chamber for holding the cakes of fatty matter, either with or without what the patentee terms a fountain, which is also for holding the tallow. It has two, three, or more wick holders, which have each an air shaft, the outer entrance of which is a little below the top of the wick holder. From thence it proceeds in the form of a semicircle under the wick holder to the inner side of the same, nearest to the chamber for holding tallow; and the inner entrance is at a level with the flame of the lamp, so that the air that enters through the air shaft is conducted through the flame, thereby increasing its brilliancy. A small plate is placed over each air-shaft, in contact with the flame from the wick, its inner end being in the tallow chamber, by which means it assists in keeping the tallow in a liquid state. Before lighting the lamp a lighted candle, which the patentee terms an auxiliary light, is placed in the column of the lamp directly under the bottom of the tallow chamber, and remains there until the tallow is partly melted, it is then extinguished, and the lamp lighted.

John Whitehouse, jun., of Birchall-street, Birmingham, for *improvements in the construction of spring hinges and door springs*, March 7.—The patentee does not claim any of the parts separately, but he claims, first,—the mode of combining the parts into spring hinges; and, secondly,—the mode of combining the parts for a door-spring together with suitable means of connecting such apparatus with a door.

The hinge is composed of two flaps, one of which is smaller than the other, and is provided with a spring barrel, the upper and lower caps of which are square, so as to enable the flap to keep the barrel from turning; but the lower cap has a cylindrical neck extending from it, upon which the lower end of the larger flap turns. In the centre of the spring barrel is an upright spindle, or axis, the upper end of which is square, and enters an opening

in the upper end of the larger flap, so that on that flap moving it turns the spindle. The lower end of the spindle is conical, and turns freely in suitable bearings in the lower cap of the barrel.

From the spindle, at a little distance from its bottom, a short horizontal axis extends, on which is a friction roller, above and in contact with which is an inclined surface, that is capable of moving up and down the spindle, but is prevented from turning by a feather which enters a groove formed in it; and resting on the top of the inclined surface is a spiral spring, which extends to the top of the barrel.

On the door being opened, the spindle, together with the short horizontal axis and friction roller, is turned round by the larger flap acting on the square top of the spindle, and the friction roller acting on the under side of the inclined surface causes it to rise, thereby compressing the spring; so that on the door being let go the spring expanding forces down the inclined surface, which turns the spindle, and the spindle in its turn acting on the larger flap closes the door.

The door spring is similar in its parts to the hinge, except that the inclined surface forms part of the spindle, in place of moving up and down; and the friction roller travels on the top of the inclined surface, the socket which carries it being capable of moving up and down the spindle, and on the top of the socket rests the spring above mentioned. The door spring has only one flap, having an arm or bar in place of the larger flap, the square top of the spindle entering an opening in the bar. In attaching this spring, a plate of iron is fastened to the side of the door, through an opening in which plate the end of the bar enters. The action is the same as the hinge.

The patentee shows two other door springs, the parts of which are essentially the same as the above, except that in one of them he substitutes an elleptical spring for the spiral one, and in the other there is a slight variation in the action of the friction roller and socket.

William Coltman, of Leicester, frame-smith, and Joseph Wale, of the same place, frame-smith, for *improvements in machinery employed in frame-work knitting or stocking fabrics*, March 7.—Claim first.—The mode, herein-described, of constructing and applying framing to machines for making stockings and knit fabrics, whereby several machines may be driven by a single main shaft, and each stopped and started without reference to the others in the same framing.

One main shaft extends through several machines, which are all contained in the same framing, and on it are fastened as many cog wheels as there are machines to be put in action, one in each machine, and they communicate motion to the different parts of the machine by wheels and levers. Each cog wheel is capable of allowing the main shaft to revolve without it, by means of a coupling box, one half of which is fixed on the nave or boss of the cog wheel, and the other half slides on the main shaft, whereby the cog wheel may be connected or disconnected at pleasure.

Claim second.—The mode of applying sliding bolts, and parts connected therewith, for working the jack-sinkers of machinery for making stocking and frame-work knitting fabrics.

In working the jack-sinkers, the jacks are shorter than usual, and do not move on an axis passing through them as heretofore, but simply rest on what the patentees call a jack-bar; and in place of the jacks being each connected to a sinker by a pin joint as heretofore, each jack is connected by a pin-joint to a sliding bolt, and each sliding bolt is connected by a pin-joint to a sinker. The sliding bolts are guided in their up and down movements by means of combs, and their position in respect to the front and back of the machine may be adjusted most accurately by means of gauge bars.

Claim third.—The mode of applying tickling points and bars, and the means of stopping the machinery at the proper times for narrowing the work.

On each of the bars (to which the tickling points are fastened) is formed a toothed rack, and by means of a pinion the bars can be moved in opposite directions, in order to cause the tickling points to be correctly placed, so that in going into the machine the tickling points will come directly on to the beards of the three external needles, on which there are loops at each selvage of the fabric, in order to receive the loops therefrom, and carry them in towards the middle of the width of the fabric, a distance equal to two needles, and in such a manner that when the loops so taken off are again placed on needles there will be one loop on the outermost needles at each of the selvages, and two loops in each of the two next needles, counting towards the middle of the fabric from the external selvage needle at each selvage.

The machinery is stopped at proper times for narrowing the work, by means of a suitable arrangement of wheels and levers acting on the coupling-box of the cog wheel, mentioned under the first claim.

Claim fourth.—The mode of constructing jacks of jack-sinkers, and the mode of applying springs thereto.

The improved construction of jacks consists in removing the tails of the jacks beyond the axis of motion, which in this instance is similar to that heretofore used; and in place of having the jack springs applied to the tails of the jacks at the back of their axis of motion, the springs are placed in front, and the front upper surface of the jack is formed into a kind of hook.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page* 150.)

Thomas Horne, Birmingham, brass-founder, for *improvements in the manufacture of hinges*, March 3.—Claim first.—The improved mode of preparing the strips or plates of iron for hinges, so that the "fibres" of the metal (as they are commonly termed) shall be laid or placed crosswise of the hinge.

The patentee makes the grooves, indentations, or thinner parts, which are intended to form the knuckles or joints of the hinge, at intervals across the plate or strip of iron, of which the hinges are to be formed, and which afterwards being separated to form the two parts of the hinge, will have the fibres situated across each piece; whereby the metal can be turned round to form the knuckle, with greater ease and safety, and a much stronger knuckle can be made than when the fibres of the iron are placed longitudinally in the hinge.

Claim second.—The expanding or spreading out of those parts which form the knuckle or joint of hinges, which have been previously cut or separated, by means of any description of press and appropriate tools, in order that there may be sufficient width of metal to enable the workman to form a close and neat joint.

The patentee, by means of any suitable apparatus, gives a pressure to the thinner or knuckle parts of the pieces of metal, after they have been cut out or separated from the piece or sheet, for the purpose of further expanding those parts, so as to allow the workman to remove the surplus parts, in order to make the joints of the hinge perfect. This operation may be performed either separately, or in conjunction with the herein-after described process of counter-sinking the screw holes.

Claim third.—The operation of previously counter-sinking, or first preparing the screw holes, by means of coned dies, as herein described, instead of altogether cutting out those parts which admit the heads of the screws, by cutting tools or drills, as generally used for that purpose.

The counter-sinking of the screw holes is effected by two dies. The lower or fixed die is provided with raised conical pieces to counter-sink the screw holes, and has a step or lower part formed in its face, in order to correspond with the thick and thinner parts of the piece of iron; the upper die or ram has only a flat face or surface.

The piece of metal after being made hot is placed on the lower die, the conical pieces being opposite the previously-punched screw holes, the upper die is then made to descend, and by its pressure force the pieces of hinge metal upon all the raised conical studs; at the same time it expands the thinner or knuckle part of the metal.

The three operations, of expanding the thin part of the metal, punching the screw holes, and counter-sinking them, may likewise be effected at one time, in which case the upper die has the step formed upon it to suit the figure of the metal, and has also a punch affixed to it, having a conical shoulder intended to form the counter-sinking of the holes; the lower die has in this instance holes or apertures formed in it, to allow of the discharge of the pieces of metal, punched out by the punch on the upper die.

And, lastly, the patentee claims these several operations, whether effected in combination or separately.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 15th of May.

Richard Farger Emmerson, of Walworth, gent., due May 3.

John Rapson, of Limehouse, millwright, due May 5.

Henry Hind Edwards, of Nottingham-terrace, engineer, due May 5.

Pierre Mathew Mannoury, of Leicester-square, gent., due May 5.

George Gwynne, of Duke-street, Manchester-square, gent., due May 5.

George Dacres Paterson, Esq., of Truro, Cornwall, due May 5.

Henry Kirk, of Blackheath, gent., due May 5.

John Clarke, of Islington, Lancaster, plumber and glazier, due May 5.

George Delianson Clark, of the Strand, gent., due May 5.

Alexander Horatio Simpson, of New Palace-yard, Westminster, gent., due May 5.

Andrew Kurtz, of Liverpool, manufacturing chemist, due May 5.

George Halpin, jun., of Dublin, civil engineer, due May 7.

William Crofts, of New Radford, machine-maker, due May 7.

Charles de Bergue, of Blackheath, gent., due May 7.

Edward Dodd, of Kentish Town, musical instrument maker, due May 7.

George Edmund Donisthorpe, of Leicester, machine-maker, due May 7.

PATENT LAW CASE.

In the Vice-Chancellor's Court on Saturday Mr. K. Bruce moved for an injunction, in the case of Mr. Woodcroft against Messrs. Rayner, to restrain the defendants from making use of certain machinery, which was alleged to be an infriugement of a patent obtained by the plaintiffs in January, 1838, for certain improvements in the construction of looms for weaving various sorts of cloths, which might be set in motion by any adequate power. The chief part of the invention, which was alleged to have been infringed by the defendants, consisted in forming the tappet-plate by which the pattern is determined of a series of corresponding sections, each section having either an elevator or a depressor cast upon it in such a manner that by changing the relative positions, and thus forming new combinations of sections (which, when placed together, formed the entire tappet-plate), the pattern might be varied without the expense and delay of casting a new tappet-plate for each new pattern. The defendants had used a machine by which the same effect was produced by constructing the elevators

and depressors themselves moveable, and thus creating an endless variety of tappet-plates of different forms. The question was whether this was such a manifest infringement of the plaintiffs' invention as to entitle them to an injunction.

On the part of the defendants the want of novelty in the plaintiffs' patent was urged, and it was contended that the defendants' invention was an improvement upon what was commonly in use in 1835, and was in no sense borrowed from the plaintiffs' contrivance. It was also submitted that the plaintiffs were precluded from making the present motion on the ground of acquiescence. It was shown that their agent went to the defendants in May, 1840, and inquired whether the tappet-plate used by them was the same as the plaintiffs'. The tappet-plate was produced to the agent, who was shown that it was different, and yet no step whatever was taken until nearly a year afterwards. The plaintiffs were therefore not entitled to an injunction until they had established their right at law, more particularly as the effect of an injunction would be to stop the defendants' works, and throw upwards of 600 men out of employ.

The Vice-Chancellor said, it was a very nice and curious question. As the plaintiffs stated it, the patent was good in point of novelty, and the only question was, whether there had been any infringement, for he put all the other parts of the case out of consideration. He then examined minutely the two inventions, and said it appeared to him on the whole to be a very fair question for a jury to determine whether the piece of machinery which the defendants had constructed came within the meaning of the plaintiffs' specification as a "section having either an elevator or a depressor cast upon it." If he were prepared to say that it was, this would be a proper case for an injunction; but, from the way the case was brought forward, he thought, before the Court did anything in the matter, the question ought to be sent to a jury to determine whether the thing constructed by the defendants was any more than a prosecuting the same idea upon which the plaintiffs had produced their invention. He should therefore make no order upon the motion, but give the plaintiffs liberty to bring such action as they might be advised.

INJURIOUS EFFECTS OF THE PATENT LAWS.

To the Editor of the "Inventors' Advocate."

SIR,—I shall feel obliged by your continuing your remarks relative to Patent Rights. I feel assured that thousands who may happen to read them will at once allow the utmost necessity of the alteration of the present difficulties in securing protection for inventors. For my own part, I have had five or six different inventions, which would have not only enriched myself as the inventor, but several of them would have benefited society in general; but the insurmountable barrier that stands in the way in the shape of fees and expenses to procure protection, and even then not protected after having spent several hundred pounds for each, has prevented me from taking out patents. The consequence is, that the inventions have lain dormant, lost to the public, and lost to myself, and with little prospect of ever being brought to light, unless a speedy alteration of the law takes place.

Now what is the consequence of the present state of the law? You know it well, and so do I: but how should it be removed? Is it not lamentable to behold our legislators so careless and indifferent to one of the principal sources of revenue and greatness. *I say both are implicated* in a proper protection of integrity and honest industry. Let once the *law protect the honest inventor* (*not the plagiarist*, who thrives in plundering the inventor, who calls his neighbour's hard-won honor his own, because he may have purchased it by wealth over the poverty of the poor inventor)—I say let the law not only protect *actual invention*—by a small bonus—independent of a period of right, and that period a proper time, not *too short*, and see what a difference a few years would make in the face of our manufacturing communities.

Even in the worst of times, any thing *new* and original, even when trade is at its worst, and when money is said to be *scarce*, will find its way into all quarters, commanding a trade, *employing thousands*, and giving a living to all. Now, if this applies to one, does it not equally apply to the many useful articles that would then make their appearance? If thus fostered by the all-powerful arm of Government, which would be the best check over the *pirate* and *unprincipled*, who are continually hounding after the spoil of the inventor, and taking shelter under the *tapestry of the law*, merely because they can play the game at "hide and seek," and are richer in the coinage of the realm than of the brain.

As an instance of the advantages that would follow an improvement in the law, I may direct the liberal-minded statesmen, who were the means of passing the Registry of Designs Act, to look what it has done even in twelve months' time. Six hundred original designs and inventions, &c., have been secured to the public, as well as to the parties reaping the benefits thereof. At the same time, a revenue has been created. Yet nevertheless, good as this act is, still in many instances it could be improved. Were that act still more extended, which might be easily accomplished by the same *machinery*, and even more simplified, then would you see in place of hundreds in the year, thousands.

Now, what a prospect does this present to the legislators of the country, to turn from the turmoil of politics to lay their heads together to protect the *improvements of machinery*, the arts of design, &c. Often have I wondered at the supineness of our Government in not fostering the inventions of our country, as is done in France and on the Continent; and if ever inventions deserved encouragement from Government it is *now*, when every sort of ingenuity is rewarded and purchased by our continental neighbours. The Government ought to induce those to exert themselves who are now actually indifferent, knowing well *the little chance* they have of protection for their inventions; and thousands are to be found in Great Britain at this moment *ingenious and in poverty*, their ingenuity being lost to themselves and the country.

Were it possible, Mr. Editor, to add one word to the many enlightened appeals made to those in authority by yourself, I say it is the duty of the press generally, loudly to call on the Government for a more extensive change in our patent laws; and sure I am, that were a firm and vigorous demand to be made on them, the year 1841 would be remembered as the emancipation from the thraldom of the *feudal times*—of the encouragement of monopolies during the earlier ages—when it was given to *court favorites* in place of the hard *worn mechanic*. Let the press make the demand, and a £10 note may give an inventor 7 years or 14 years' protection; and that I have no hesitation in saying would bring the Government more *as a revenue* than the hundreds they charge at present. Many of the *inventions registered at present* it would *take twelve months, nay two years*, to get the machinery to manufacture, *and the article introduced*. When the inventor has got all the drudgery over, he is then to give the *benefit to the public*. I trust that something will be soon done. I for one have six inventions waiting for the new revolution in the patent law. I would pay £20 for each, were I sure that no *legal quibbles* would rob me of my property. When this amendment in the law is effected, I may then have it in my power to encourage the Government, as well as your valuable paper, which I wish from the bottom of my heart may prosper.

I am, Sir, your constant subscriber,
Glasgow, March 8, 1841. A. R. R.

[Our correspondent seems to be in error as to the extent of protection afforded by the Registry of Designs. No protection is given to *inventions* by that Act; it relates only to *forms* and *patterns*.]

FOREIGN INTELLIGENCE.

FRANCE.

INCREASE OF MANUFACTURES AND TRADE IN FRANCE.

La Presse contains a summary of the report laid before the Chamber of Peers by M. Cunin Gridaine, the Minister of Commerce, from which it appears, that since the French Government reduced the protecting duties on foreign produce the trade of the country had increased considerably. Thus in the year 1829 the general trade of France, including the merchandise in the Government stores, amounted to 616,000,000 francs, and the exports to 604,000,000, and the foreign produce imported amounted to 483,000,000, and the exports to 504,000,000f., whilst in 1839 the general trade amounted to 947,000,000f., and the exports to 1,003,000,000f, and the amount of foreign produce imported to 650,000,000f., and the exports to 677,000,000f.

French navigation improved in a similar proportion with that of trade. The French tonnage in the year 1829 amounted to 647,000 tons, and in the year 1839 to 1,200,000 tons.

Domestic produce increased in a similar proportion. The French coal mines produced but 17,000,000 of metrical quintals in the year 1829, and in the year 1839 they produced more than 30,000,000. "And what is still more remarkable," observes M. Cunin Gridaine, "this immense progress in domestic consumption was realised concurrently with the consumption of foreign coal, for the quantity of that article imported in the year 1829 amounted only to 5,000,000 of metrical quintals, and in the year 1839 it amounted to 12,000,000."

"If," continues M. Cunin Gridaine, "from coal we pass to iron, we find that in the year 1828 France possessed 393 furnaces, producing 2,000,000 metrical quintals of cast iron, and 1,295 furnaces for refining, manufacturing annually 1,500,000 metrical quintals of iron. At present France possesses 475 furnaces, which produce annually 3,477,000 metrical quintals of cast metal, worth 63,000,000 of francs, and 1,500 furnaces for refining, which produce 2,241,000 quintals of iron, worth nearly 93,000,000 francs."

"Similar improvement is to be found in most of the domestic productions. Lyons has increased her silk looms from 27,000 to 40,000, and the exportation of silk stuffs, which in the year 1829 amounted only to 111,000,000, reached, in the year 1839, to 141,000,000.

"No less remarkable has been the improvement in the woollen and cotton manufactures. The exportation of woollen stuff amounted in 1829 to only 30,000,000 francs, and increased in the year 1839 to 60,000,000 francs. And the export of cottons increased from 47,000,000 to 85,000,000 francs within the same period. The natural consequence," concludes M. Cunin Gridaine, "to be derived from this increase of manufactures is the diminution in their price, which renders them more accessible to the mass of consumers. Bar iron, which ten years since sold at from 49 to 68 francs the 100 kilogrammes, according to the quality, now produces not more than from 35 to 50 francs at most. Woollen stuff, which sold at the same period at from 40 to 50 francs the piece, now brings only 25 francs; and calico, which in 1829 was sold for 80 centimes, is not now worth more than from 40 to 50 centimes."

ACADEMY OF SCIENCES, MARCH 1.

The Artesian well of the abattoir of Grenelle was the subject that principally engaged attention during this sitting. M. Arago repeated the principal facts already published with respect to the facts that have been recently made known, and he added some interesting statements respecting the difficulties that have been encountered during the execution of the work, and on the quantities of the water of this spouting spring. The manner in which the boring has been carried to the depth of 1,650 feet, the skilfulness with which obstacles have been

surmounted, and accidents repaired, confer the greatest honor on those engaged in the undertaking. Messrs. Mulot, father and son, have been engaged in this work for seven years, and it may be conceived what difficulties they had to encounter in guiding and managing the sound at the extremity of an iron rod, which eventually reached the distance of five times the height of the spire of the Invalides. What skill and perseverance was requisite to direct the instrument to such a distance, through such various beds of soil, sometimes chalk, sometimes quicksands, and sometimes blocks of granite; and when the sound separated three times from the rod, and fell with its whole weight to the bottom of the holes, it was necessary to take hold of it at the distance of twelve or fifteen hundred feet, and bring it back to recommence the work again. One of these accidents required more than a year of perseverance and patience before it could be repaired; but the zeal and resources of M. Mulot never relaxed. On every difficulty, or every new misfortune, this able mechanic, who was formerly a locksmith at Epinay, understood how to employ different expedients, and by talent and courage he has conquered every obstacle. At length he has beheld his undertaking crowned with success. Last Saturday, after having drawn from the bottom some particles of green sand, which announced that the termination of his labors was approaching, he witnessed the rushing up of the column of water which he had been seeking for at the distance of more than fifteen hundred feet underground. Here is a grand result, very interesting to science, and to the geology of the bason of Paris, probably capable of useful applications, and the execution of which is considered the chef d'œuvre of the art of boring. And yet, if we believe accounts highly worthy of credit, we are still very inferior to the Chinese in this point. While we are expressing our astonishment at an Artesian well of the depth of 1,500 feet, undertaken at the expense of the town of Paris, by the advice of the most distinguished engineers, and with the support of M. Arago, it appears that in China wells of the depth of 3,000 feet are quite common. We are almost wholly ignorant of the means employed to execute soundings such as these in that country.

The quantity of water thrown up by the well at Grenelle appears to be considerable. It does not raise less than four millions of litres in twenty-four hours, according to the calculations of M. Arago; which is equal to half the quantity of water supplied by all the water-works in Paris together. The water is at present mixed with a great quantity of sand and gravel, which it brings up with it, but it will no doubt very soon be clearer; in other respects, analysed as it has been by M. Pelouze, after having been merely filtered, it becomes more pure than the waters of the Seine: it entirely dissolves soap.

The temperature, at the depth of 1,550 feet, compared with the thermometers at the cellars of the Observatory, which never vary, is nearly an increase of one degree of heat on every 32 metres of depth.

The bottom of the well of the abattoir of Grenelle is 516 metres below the usual level of the sea. This depth is much lower than the bottom of the sea itself, excepting at a very great distance from the coast. To bore a well of this depth is not all; it is also necessary, in order to prevent obstruction from sand, and from the falling of the earth, to furnish it with tubes which extend the whole way. These tubes, which are of metal, run into each other nearly on the same plan as those of a telescope. The necessity for such a length of tubes is not a slight difficulty, nor the adapting them so as to be able to fit; calculating their diameter according to the distance they will have to descend. Many times, when they were sunk less than the proper dimensions, it was requisite to draw them up again, to enlarge their size; and now they form a solid canal, and extend 557 metres. The lower orifice of the hole is thus much narrower than its aperture, yet it is not less than 17 centimetres.

The present object of excitement in Paris is the Artesian-well, at the Abattoir of Grenelle, which has been successfully completed by M. Mulot and his son, after seven years' labor. The people flock in crowds to the spot, provided with bottles to taste and bring away some of the water that issues from such an immense depth. The hole is four times as deep as St. Paul's Cathedral is high. On Monday, the boring instrument was withdrawn, and, as expected, the quantity of water that issued from the orifice was consequently increased. It is stated, that when completed, the water will rise to the height of thirty feet above the surface. It is suggested by the *Journal des Debats*, that the force of the rising water might be valuable as a moving power, and that it may be found adviseable to make these wells for the purpose of so applying the force.

BELGIUM.

SCARCITY OF COALS IN ANTWERP.

The *Journal du Commerce* of Antwerp, alluding to the dearness of coals in that city during the late severe weather, says:—"There is a general complaint of the scarcity and expense of coals, which is considerably increased by our being unable to receive them in any other way than by railway. Now this method of transportation is too expensive. When there is a scarcity of corn, government allows its importation duty free. Should not the unusual rigor of the season and the impossibility for the poorer classes of procuring coal fuel, suggest similar measures with respect to coal? Our town contains extensive depôts of English coals, intended for the supply of vessels going to sea, and particularly for steam-boats. The duty on the consumption of foreign coals being 14 frs. 81c. the 1,000 kilogrammes, and 16 per cent. additional. This is equal to a prohibition, and all the coal imported is necessarily sent out of the country."

The second chamber of the court of appeal at Brussels lately made a decree of great importance concerning commercial companies. It is known that the statutes regulating most of these companies contain a clause which confers on the shareholders an annual interest of 5 per cent., independent of any dividend. The question having arisen whether a shareholder can demand payment of this interest when the company has not derived any profits, or even when it has sustained loss, a decision was given in the affirmative. The Court of Appeal, from motives arising from the special contract which was submitted to it, as well as from principles by which joint stock companies are regulated, reversed this decision. The decree declares, that such a clause, executed to the letter when loss is sustained, or no profits are derived, being liable to abuse, and injurious to others, ought to be considered immoral, opposed to public order, and not obligatory.

The registration of machinery and implements imported into Belgium, with conditional exemption from paying duty, since March 8th, 1840, to February 15th, 1841, contains three entries from England, six from France, one from Prussia; altogether 15.

A company is forming in Brussels, for the purpose of establishing in that city a Pantechnical Bazaar. The courts and buildings adjoining the Palais d'Orange are to be the site of this establishment. The *Fanal* anticipates great things from the formation of this perpetual "exposition" of objects of art and industry, in the "great hotel on the road to Europe," as it designates Brussels.

RAILWAY INTELLIGENCE,

DOMESTIC AND FOREIGN.

London and Croydon Railway.—On Tuesday the eleventh half-yearly general meeting of the proprietors of this railway was held at the London Tavern. From the report it appeared that during the half year ending the 31st of January, 1841, 214,541 passengers were conveyed, whose fares amounted to £14,292 2s. 1d. The amount received from annual, prepaid, half-yearly, and quarterly tickets amounted to £1,035 1s.; the carrying of goods brought in a sum of £1,364 14s. 0½d. The total income of the half year was £19,081 17s. 8½d., the expenditure £18,322 14s. 2d., leaving a balance of £759 3s. 6½d. in favor of the company. During the same period the company received the first instalments of the purchase-money for their portions of the London bridge station: namely,—from the South-Eastern Railway Company, £5,000; Brighton Railway, £5,000; and from the Brighton, Croydon, and Dover Joint-Station Committee, £1,137 15s. 3d. The actual balance of the cash account for the year was £7,956 9s. 3d. in favor of the company. The report was adopted unanimously; after which the election of officers took place, and the meeting separated.

London and Brighton Railway.—The works on this great undertaking are approaching completion at even a more rapid pace than the last report of the directors gave us reason to expect. Both the Merstham and Balcombe tunnels are finished; and a small portion only of cutting remains to be excavated at the approaches. Mr. Rastrick, the engineer, has engaged to convey a party of the directors on the line from London-bridge to Hayward's heath in the course of a month. At Clayton the tunnel is nearly finished; and the line will be completed from Brighton to the Hassocks station in June, leaving only the small portion of the line which extends from the Hassocks to Hayward's-heath unfinished. We are assured that the opening of the line throughout the entire distance will take place by August next.—*Brighton Gazette.*

The contemplated arrangements for the introduction of the Brighton Railway into the line now occupied by the Greenwich Company have at length been entered into, and contracts made for the erection of the necessary approaches. We understand that the terminus now occupied by the Croydon Company will be taken for the use of the Greenwich Railway; and the large house, known as the Railway Tavern, immediately adjoining the London entrance, will be pulled down at once. The shrubbery near St. Thomas's Hospital will also be removed, the Brighton line being intended to open at that point into the Borough.—*Brighton Gazette.*

Bristol and Exeter Railway.—The ninth half-yearly meeting of the proprietors of this company was held on Tuesday week at Bristol. Frederick Ricketts, esq., the chairman of the board of directors, took the chair.—"He said the directors' report, that of the engineer, and the statement of receipts and expenditure, have been laid on the table, and I congratulate you upon the great improvement which those documents show in the circumstances of your undertaking. At the period of our last meeting, there was a great degree of uncertainty whether you could reach the borrowing point without another call, but I have now the satisfaction of stating that some thousands above the sum of £750,000, required by your act of parliament, have been received, and the promptitude with which above £50,000 have been paid on account of allotted shares, gives me a confident expectation that the remainder of this will be received within a few days of this time. One other circumstance is too important and gratifying for me to leave unnoticed. Upon the *principle* of allotment of forfeited shares, I believe, upon a former occasion, there was almost a universal sentiment of approbation; but there were many who thought that a considerable number of those shares would be unclaimed, and that a

second allotment would be necessary. Now, gentlemen, very far from this being the case, the report will show that every share has either been taken up by the party to whom it was allotted, or disposed of with advantage to the company; and it will be an additional satisfaction to know that by the sale of these surplus shares to highly respectable purchasers in London and other places, at a distance from Bristol, several new and excellent names have been added to the register. Gentlemen, you must allow me to advert to one other contrast between your position at the last meeting and the present: then you had about £20,000 in your banker's hands; now, after paying your contractors up to Friday last, your balances in your banker's hands amount to upwards of £100,000. I do not hesitate to declare my firm and deep conviction, that the great transition in the circumstances of your undertaking is almost exclusively attributed to your allowance of interest on paid-up calls, the lease to the Great Western Company, and the allotment of forfeited shares. The secretary then read the report of the directors. It stated that the line would be opened to Bridgwater in June next; and it confirmed the favorable views of the undertaking announced to the meeting by the chairman. Mr. Brunell's report was afterwards read, and received throughout with much cheering. He is of opinion that the line may be opened, by the month of May, to Bridgwater; and to Taunton in the summer of the succeeding year. The reports were adopted with expressions of approbation, and the whole of the proceedings.

Thames Haven Railway and Dock Company.—The adjourned general meeting of the proprietors of this company took place on Friday, at the London Tavern, James Esdaile, Esq., in the chair. The attendance was rather numerous, and a large number of gentlemen from Manchester, headed by Mr. Potter, M.P., were also present, anxious to know the result of the negotiations at present proceeding with the large coal owners in the north. After a long discussion, Sir George Stephens proposed a further adjournment for fourteen days, in consequence of the arrangements between the above parties not being completed. This suggestion was supported by the chairman, who stated that Mr. Amswick, who was not present, was very anxious to bring the negotiations to an early conclusion. The meeting entered into these views, and the adjournment was accordingly assented to. Should these arrangements be amicably concluded, it is stated that coals will be sold in London at one half the present price.

Dublin and Drogheda Railway Company.—The half-yearly meeting of the above company was held on Thursday week. The report of the directors was received with evident satisfaction, and we are gratified to find that it truly represents the affairs of the company as in a most prosperous state. The contracts already let are being actively proceeded with. The contracts extend from Dublin to Donaheat, which is the most expensive portion of the line; yet it is said the directors will be able to complete the entire line for the reduced estimate of £14,000 per mile. The *Dublin Monitor* observes on this statement, "this is a very cheering fact, and we congratulate the public upon the successful manner in which this great national undertaking is proceeding, despite of all the difficulties with which it has been forced to struggle. The directors deserve great credit for their energy and perseverance, though surrounded by obstacles which, had they been less zealous, might have overwhelmed them, and destroyed the company. As it is, the company has now the pleasing prospect of speedily seeing the completion of their splendid and truly national undertaking."

Hull and Selby Railway.—By the report of the Hull and Selby Railway Company we perceive they are making accommodation for the large increase of traffic, &c., which will doubtless be obtained by this line. Although the expenses of working the line for the last half year have amounted to nearly 50 per cent. on the receipts, the great increase of the traffic consequent on the opening of the Manchester and Leeds and other lines of railroad, and the great reduction in the number of the company's servants, will be the means of lowering that to only 30 per cent. The whole cost of the line being only little more than £18,000 per mile, and the fact of a dividend being declared out of the profits for the first half year (which very few other lines have been able to do), and for two months of that period no goods were conveyed, may be considered a prelude to the handsome returns that will be realised by the proprietors, when the resources of the line are fully developed. This line bids fair to be one of the most profitable of the Yorkshire railways.—*Leeds Times.*

Stafford and Rugby Railway.—A very numerous and highly-respectable meeting of the principal landowners and inhabitants of the town and neighbourhood of Tamworth was held on Saturday, for the purpose of taking the sense of the town and neighbourhood upon the above measure. Resolutions in favor of the railway were passed unanimously, and a petition to Parliament in its support was agreed to.

RAILWAY ACCIDENTS.

A Workman Killed.—An inquest was held on Friday, at Southampton, on the body of a man employed to work on the railway, who was knocked down and run over by the down train on the same day. The up train had passed about a minute before, and the deceased had been cautioned that the down train was coming, but he did not stand out of the way, and the engine struck him on the head, and the whole train passed over his body. The wind and rain was at the time very strong, and it is supposed prevented him from hearing the train approach. Verdict, "Accidental Death."

A Fall from an Engine.—On Tuesday afternoon John Weble, an engine-driver on the Northern and Eastern Counties railway, fell off his engine when near Broxbourne, and the whole train of carriages passed over him. Several of his ribs were broken, and his right leg was severely lacerated. He is not expected to recover.

Fatal Consequences of Trespassing on Railways.—On Saturday an inquiry into the circumstances connected with the death of Joseph Painting took place at Reading. It appeared that the deceased, who was 77 years of age, was very deaf, and while on his return home between 5 and 6 o'clock, he crossed the line of railway at a spot where there was no road or footpath whatever. At this time the Spitfire engine, with a train, was passing along with the accustomed rapidity, but the engineer did not perceive the poor fellow until it was too late to warn him of his perilous situation. He, however, as soon as possible, stopped the engine, the forepart of which had struck the deceased over his right eye, and thrown him off the rail. He was conveyed to the Reading station, by which time, however, he had expired. Verdict—"Accidental death."

FOREIGN RAILWAYS.

The Railway from Paris to Rouen.—The *Courrier de l'Eure* says the Paris and Rouen Railway Company have been actively engaged since its formation with the great work that it has undertaken, and though the public has not hitherto heard much of its operations, the time which has elapsed since the last session has notwithstanding been advantageously employed. Our readers will learn with pleasure that these works, which will be in future of so much importance to our department, are commenced. The company have just made a contract for the construction of every part of the railroad, from Poissy to Asnière, where, as is known, it will branch off on the road of St. Germain. This line comprises the construction of two large bridges over the Seine, one to Besons, the other to Maisons. A second line is also undertaken on similar terms for the completion of two of the most important and difficult works in the whole line; the tunnel of 3,000 metres, between Rolleboise and Bonnières, and the excavation at Venables (in the arrondissement of Louviers). A third contract is going to be entered into immediately for the portion in Poissy and Mantes; indeed all the plans are arranged, and every preparation made for commencing the road from Mantes to Paris in the year 1842, that is, in the course of 15 months; and it is expected that the whole line will be finished in 1843.

TO CORRESPONDENTS.

Our answer last week to "An Old Subscriber," *respecting the revocation of foreign patents, was intended to apply only to patents granted in France, Belgium, and Holland. Another* "Old Subscriber" *wishes to know the state of the law in Prussia: we, therefore, subjoin the times fixed for the revocation of patents when not brought into use in all the principal states in Europe:—Prussia, six months—Austria, twelve months—Roman States, twelve months—Spain, twelve months and a day—France, Belgium, and Holland, two years—Sardinia, and some other States, discretionary with the government.*

THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, MARCH 13, 1841.

We have, in the two preceding numbers of our Journal, pointed out the ground on which an inventor founds the right to the property of his creation; and we have considered the objection raised, on the plea of public injury, to his enjoyment of that right. We endeavored to show, that his claim rests on the strongest foundation on which any title to property can be built, and also

that the public are benefited, instead of being injured, by giving to inventors the protection they are equitably entitled to. We shall now proceed to state the obstacles which the existing patent laws present to the admission of their claims; the difficulties which an inventor has to surmount in procuring the protection of the law for his property; and the insecurity of the protection after it has been obtained.

The first thing to be considered by an inventor is, whether his discovery, or new adaptation of known mechanism to produce a different effect, be of a nature which qualifies it for protection by the patent laws. It is disqualified if it involve the appropriation of any *principle*, though he be the original discoverer, for it is not permitted for any one to monopolise a principle; the mode of *applying* the principle can alone be appropriated. The invention is disqualified if it be injurious to the public; and it is also disqualified if it be not new. All these grounds of disqualification seem well-founded; the only complaint that the inventor can reasonably make on this account is, that there is no sufficient provision by the law to caution him against squandering his time and money in prosecuting an invention which cannot be protected.

The usual course an inventor pursues is to apply in the first instance to a patent agent. He wishes to know whether at any time there has been a patent granted for a similar invention; and he is at once stopped in his progress. He cannot reveal the peculiarity of his invention without risking its loss. He must trust entirely to the honor of the party, for there is no law to punish the breach of faith, or rather the robbery, which might be committed of his invention. All that he can safely do, is to describe the effects it is intended to produce. The agent then, if he possess the means of reference, and will take the trouble to examine, may give the inventor a list of all the patents that have been taken out for similar objects; and the inventor may go to the different offices where patents are enrolled, and, *on payment of the fees*, be permitted to examine the specifications, to ascertain whether any one in the list embodies the same improvements as his own. The patent agent, we must not omit to observe, recommends, as a preliminary step, that the inventor should enter a *caveat*. For this a fee of one guinea is requisite, and it is generally the first step taken on obtaining a patent, for few inventors are at the trouble of examining the specifications at the different offices, as each one feels confident that the happy thought has not suggested itself to any one before. The object of a caveat is to secure an inventor from the possibility of a concurring patent being granted to some other person. It procures him a notice from the Attorney or Solicitor General, if any application be made for a patent of a similar kind. In that case the competing inventions are submitted to the law officers, who, *on payment of the fees*, amounting to three pounds ten shillings, examine whether they are similar, and if so, the parties are left to to settle the priority of claim to the invention, as the first entry of the caveat gives an inventor no precedence.

If the application for a patent be not opposed, it is granted as a matter of course. There is no inquiry made by the legal officers of the crown whether the ground on which the application for the exclusive privilege is founded be true or false; whether, excepting in notorious cases which are generally evident, the invention be new or old. The *fees*, amounting to about one hundred pounds, are in either case received.

The patentee then obtains a scroll of parchment covered with a mass of obscure verbiage, to which is appended by a piece of ribbon an enormous mass of wax in a circular tin case; and he is by this means entitled to exercise an exclusive privilege, the peculiar nature of which is not known; for were the patentee to disclose his invention before the sealing of the patent, his right would be jeopardised. This requisite preliminary secrecy constitutes a formidable grievance to inventors. It obliges them to carry on their researches and experiments imperfectly, and in secret; it prevents them from consulting and asking advice from others; and it prohibits them also from negotiating with confidence for the sale of their inventions, when they have not the means of paying the exorbitant fees now demanded before protection can be obtained. No services are rendered by the government officers to the inventor, in return for those fees, that in the least tend to obviate the difficulties he has to encounter. He is involved in great expense, without obtaining or even daring to ask for assistance or information in the prosecution of his experiments.

This grievance might be easily remedied, were the caveat, which is now for the most part a useless form, and only a means for exacting an additional fee, rendered a means really serviceable for promoting the interests of inventors, and of securing to them their rights. The inventor should be required to deposit with the Attorney General a sealed description of his invention, with the date of its deposit. This would serve to establish his claim to priority should any contending claimant subsequently appear, or should any piracy be attempted by parties to whom the invention had been shown. Thus protected, the inventor would be able at once to conduct the experiments which he is now obliged to defer till his patent is sealed, and he would thus establish on a firmer basis the merits of his invention, and be enabled to negotiate openly for its sale, without being obliged to pay protecting fees of £110, before he can in many cases even satisfy his own mind of the practicability of his improvement or discovery. It not unfrequently happens, that in pursuing the experiments in the period between the sealing of the patent and entering the specification, the inventor perceives he has proceeded on an erroneous principle. He then finds his discovery is of no value, and he therefore allows his patent to become invalid, by refusing to specify, after having purchased the exclusive monopoly from the crown. This would seldom or never occur were the inventor allowed to test the merits of his invention openly before the patent was granted. This plan might, indeed, interfere somewhat with the fee system which now crushes inventive genius, and would of course be stoutly opposed by the advocates of things as they are. There can, however, be no question, that it would afford great facilities in the prosecution of scientific discovery and mechanical improvements; but so long as the people are considered to be made for the law, and not the law for the people, we can scarcely expect any effectual reform of the present fee-exacting system.

We have not space in one article to conclude our remarks on the obstacles and difficulties against which patentees have to contend; we shall therefore continue the subject next week.

An interesting discussion took place in the House of Commons on Thursday, on the subject of the formation of museums and schools of art, in the principal manufacturing towns. We are glad to find the project supported by men of all shades of opinion. The necessity of educating and the propriety of cultivating a taste for science and the arts among the working classes in this great manufacturing country was generally admitted. Their claims on those who have been enriched by the produce of labor, were enforced in a manner that cannot fail to have a beneficial influence. We hope the subject will be prosecuted with vigor, and that the Government, after this expression of opinion in Parliament, will not be backward in giving the necessary aid for commencing at least a system of extended instruction in those most useful and improving branches of knowledge.

NEW INVENTIONS.

NEW APPLICATION OF THE DAGUERREOTYPE.

At the sitting of the French Academy on the 1st instant, a new and important improvement in the application of the Daguerreotype was announced to have been effected by M. Fiseau. He had previously greatly added to the practical effects of the instrument by contriving the means of fixing the image on the plate, so as to prevent its being easily rubbed off, and by adding to the depth of the shadows, by means of chloride of gold. His present improvement consists in applying M. Jacobi's electrotypic process to taking permanent impressions of the Daguerreotype on copper plates. By this means the particles of copper are deposited by a current of galvanism on the image, fixed by the chloride of gold, by which an engraved plate is made, which produces a beautiful effect. The original image is not only reproduced with all its minute and accurate details, but it may probably serve to take impressions on paper, or at least as a drawing of the greatest possible perfection for the engraver. The image when taken thus on copper has a most astonishing effect, and much merit is due to M. Fiseau for the discovery, which may have important results in the arts.

IMPROVEMENT IN THE STEAM-ENGINE.

A patent has lately been taken out by Mr. Thomas Stather, foreman to Messrs. Overton and Wilson, founders and steam-engine manufacturers, for an invention of his own, viz., the introduction of what he calls the steam-engine "controller." This new invention is for reversing the motion of the engine, and that instantly, by a most simple contrivance. The inventor states that his controller may be fixed in front of the helm, or a duplicate may be fixed on the paddle-box top, or centre of the platform (from paddle-box to paddle-box), so that the man at the helm or the captain shall have full and perfect control of the engine. The working model which he exhibited at a lecture in the Mechanics' Institute, going at a rapid rate, obeyed,

as soon as the words of command were spoken, viz., "slow," "backward," "quick," "forward," "stop," to the surprise of all present. The enthusiasm manifested at the wonderful control gained over so powerful an agent was such that it burst forth in loud and repeated applause for some time. By the present method the engine is stopped by removing the eccentric out of its gear, but by this discovery the eccentric remains undisturbed. In locomotive engines the extra eccentric rods will be dispensed with, only one being required, and thus saving from £200 to £300 in the cost.—*Hull Advertiser.*

IMPROVEMENTS IN STEAM-BOATS.

We have been informed that Captain Taylor, of her Majesty's ship San Josef, has lately been engaged in a course of experiments in Hamoaze, with a view to the prevention of collisions between steam-vessels, and steam and sailing vessels, such as those which have of late been of so frequent occurrence, and which have been attended with such deplorable loss of property and life. Our informant states that those experiments promise the most satisfactory result. He says that Captain Taylor "has discovered a plan by which the steam boat will be placed completely under the control of the persons on deck, as, immediately danger is seen, the steamer can be stopped, or turned round upon her own centre, and within her own length, without stopping the engine, or calling to the engineer." We have been furnished with some details relative to Captain Taylor's invention, which we withhold for the present, as we understand he contemplates taking out a patent; but should his discovery, when further tested, be found practicable, and should it have the effect of preventing, in future, such melancholy consequences as those which resulted from the late collision between the Nottingham and Governor Fenner, this able and meritorious officer will have rendered a most important service to the interests of humanity.—*Times.*

PURIFICATION OF SEA-WATER.

The *Moniteur Industriel* gives the following account of the trial of an apparatus for obtaining fresh water from the sea:—"On Wednesday a number of merchants and naval men, among whom we remarked Admiral Baudin, were present at No. 6, Rue de Buffaut, to witness the trial of a new and very simple process, employed by M. Frederic Sallier, to obtain fresh and drinkable water, by purifying the water of the sea. The apparatus used for this experiment is intended for a vessel of 500 tons. It is a kitchen in which a still is placed, whence the distilled water runs into a filter, which purifies it, and renders it drinkable by its absorption of atmospheric air. This apparatus does not occupy more room than the usual size of a kitchen on board ship. The same fire used for distilling the water serves for cooking. The mechanism is very simple, and the cook can superintend the distillation, which may be thus said to be done without trouble, by means of a pump which fills the boiler when he requires it. The last experiment, which lasted eight hours, produced 122 litres of pure water, with 30 kilogrammes of coal, and during these eight hours the pans used for culinary purposes were constantly boiling. Sea-water, purified by means of this process, possesses all the qualities of the best spring water; it has been used for dressing vegetables, and no difference was perceived between it and the water of the Seine.

M. COLLAS'S MODE OF COPYING SCULPTURES.

To construct an instrument which without the assistance of the artist or the workmen can produce with the most minute exactness any kind of sculpture, whether medal, bas-relief, or statue, and increasing or diminishing the proportions without altering the harmony of the whole; to produce a copy in wood, stone, ivory, or marble, with such great correctness that the original cannot be distinguished from the copy; such is the difficulty that M. Achille Collas has overcome. Considered in a scientific point of view, the machine, invented by M. Collas, for the reproduction of plastic monuments, is one of the finest conceptions ever known, and places the inventor in the first class of celebrated mechanics. Considered in its relation to the fine arts, the invention is to sculpture what printing is to written thoughts. A beautiful statue may, henceforth, in the same manner as a good book, be the means, without incurring any chance of change or loss, of transmitting the name of its author to distant generations. There will no longer be any distinction between the original and copy; each of the impressions will itself be the model containing the original and entire idea of the artist, and all this is effected by means of a simple machine! A child turns a wheel, a point touches delicately every part of the model with the most minute exactness, without leaving the least mark; the point acts on the chisel, the chisel cuts the marble and renders it in a state fit for operating on. By means of another process the figures of the copy are brought out, stop, or become more finished. As we have previously said, the machine of M. Collas can reduce, with the most accurate mathematical precision, and this to an almost infinite degree, the statues that are too large to be admitted into the studio of the artist or into the collection of the amateur. We have already expressed our admiration of the bas-reliefs of the Parthenon, the originals of which are in London; the Venus of Milo, still so admirably beautiful, notwithstanding its numerous mutilations, and many other valuable models, reduced in proportion of two fifths and a half, with an accuracy that is scarcely conceivable. To copy the most remarkable works dispersed in Italy, Germany, and England, to reduce them in regular proportions, to collect them in a vast universal museum, to afford the student without loss of time an opportunity of studying at home copies in every respect equal to the originals, such are the expectations that M. Collas, with the assistance of enlightened men, will be able to realise. —*Le Fanal.*

THE NEW RUSSIAN MUSKET.

A meeting of several military and scientific gentlemen took place recently at Chalk Farm, for the purpose of testing the comparative merits of the detonating musket, now about to be generally introduced into the British service, and that invented by the Baron Heurteloupe for the use of the Russian army. Though the day was wet and boisterous in the extreme, 160 rounds of ball cartridge were fired from the Baron's gun in an inconceivably short space of time, without a single failure or hang-fire; and, indeed, from the formation of the piece itself, which has the lock plased under the barrel immediately before the trigger, and which is further, by a most ingenious contrivance, completely secured from the action of the weather, the priming being contained in a continuous thin flat metal tube, impervious to moisture, and enclosed in the stock of the gun itself, rain or wet can have no effect on the action of a musket so constructed. It is, however, the composition contained in this tube, and the simple manner in which it is acted upon, that gives the invention its great superiority over all other fire-arms now in use. The tube in question, which is about eight inches long, and about $\frac{1}{8}$ of an inch wide, contains detonating powder sufficient for 30 primings, and is in the first place inserted in the body of the stock, under the barrel. A very simple mechanism causes the extremity of this tube to advance over a flat topped nipple, and the cock which strikes it is so constructed as to cut from the tube that portion which lies over the nipple, and the hammer acting upon it almost simultaneously produces the discharge. Leaving out of the question the chemical merits of a composition, which will admit of a part being cut off and exploded, without igniting the remainder of the contents of the tube, the mechanical merits of the gun as a military engine are extraordinary; it combines within itself all the *desiderata* of cheapness, strength, simplicity, certainty of fire in all weathers, and capacity for rapid execution, which are required in a soldier's weapon, and is as great an improvement over the common copper cap lock as that is over the old flint and steel principle. Many old officers have doubted the wisdom of adopting the copper cap for soldier's fire-arms, and there can be no doubt that in a military point of view it is subject to many grave objections on the score of inconvenience to the soldier using it in wet weather, or with cold hands, from its liability to fall off and split when exploded, to the injury of the man standing next, from its great insecurity from dampness, its chemical affinity for moisture, and its liability to be injured by hygrometric changes, not to mention its difficulty of management in the clumsy and awkward hands of a soldier, acting in haste, under the excitement of fire. The whole of these drawbacks are said to be avoided in the Baron's invention, which, in the opinion of the military men present at the experiment, was by far the best adaptation of the detonating principle to the common musket that has yet been seen. We are informed that the gun in question has lately been submitted to the inspection of the Master-General of the Ordnance, with a view to its adoption in the British army. The recent experiments convince us that the Baron's invention can be applied to all fire-arms, and it is, without exception, the greatest improvement yet accomplished.—*Times.*

ROTARY AND RECIPROCATING ENGINES.

To the Editor of the "Inventors' Advocate."

SIR,—I do not know whether the remarks you made in your last number (No. 83.), "on Rotary and Reciprocating Engines," are intended to provoke discussion, or are your real opinions; but, from the sound philosophy you have expressed on many other subjects, I should imagine the former. It is true that a difference of opinion still exists amongst engineers,—and of eminence too,—as to whether or not there is any power lost from reciprocation, but I believe that if the motion were properly analysed no difference would exist. I will endeavor to prove that there is *no loss of power* in converting the reciprocating motion into a rotary one, by means of the crank.

At the top and bottom of the stroke, the connecting rod, beam, &c. are quiescent, from either of which points they move with an accelerating motion until they arrive at the half stroke, and it is in those *two quadrants alone* that the motion is given to the moving parts from which they derive their momentum, and, consequently, where the power is lost. In describing the remaining portions of the circle, the case is, however, different; for the velocity decreases in precisely the same ratio as it was previously accelerated, and here the momentum acts as advantageously in producing motion as it previously did injuriously in absorbing power, that is, it has an equal and contrary effect; the fact is, that the only defect which exists in the crank arrangement is that of causing a slight irregularity in velocity which the fly-wheel and connected machinery perfectly equalise.

I could adduce many arguments in favor of the reciprocating plan of employing steam, which I think would prove that it is very superior to any rotary one that ever has or ever will be invented. In fact I have never yet seen a plan of a rotary engine in which the motion, when analysed, was not reducible into, or derivable from, a reciprocating one; and what is more, I have my doubts whether such a motion as a purely circular one, independent of reciprocation, exists in nature. Every created being in this world derives its means of locomotion from reciprocating actions, and we are not sufficiently acquainted with the cause of the revolution of the planets to say that they are *not* derivable from and maintained by the same means; let us, however, be at present satisfied with the copies nature places before our eyes and make the most of them.

I am, sir, your obedient servant,

Norwich, F. HAM, C.E.

March 4, 1841.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING MARCH 15, 1841.

Monday	Statistical Society (Anniversary)	3 P.M.
	United Service Institution..........	9 P.M.
Tuesday	Linnæan Society....	8 P.M.
	Horticultural Society	3 P.M.
	Civil Engineers	8 P.M.
Wednesday	Society of Arts	7½ P.M.
	London Institution.................	7 P.M.
	Microscopical Society	8 P.M.
Thursday	Royal Society	8½ P.M.
	Antiquaries Society	8 P.M.
Friday	Botanical Society	8 P.M.
	Royal Institution	8½ P.M.
Saturday	Asiatic Society	3 P.M.
	Westminster Medical Society	8 P.M.
	Mathematical Society	8 P.M.

ROYAL INSTITUTION.

March 5. Friday Evening Meeting.

Mr. John Edward Gray, of the British Museum, delivered a lecture "On the Growth and hard Covering of the Sea Eggs." The *Echini* are known generally by the name of sea-urchins or sea-eggs; they have a globular form, and their hard exterior is familiarly termed the shell. The shell is composed of numerous isolated pieces in the living state of the animal, and is studded with tubercles, on which are placed spines, varying much in size and form. There are likewise found numerous holes, from which proceed discs or tentacles to facilitate their movement from place to place, and by means of which they fasten themselves to rocks, &c. The use assigned to the spines on the shell is considered to be that of assisting them to bury themselves in the mud or sand.

The *Sea-eggs* are nearly allied to the *Star-fish.* They have many characters in common; the principal difference consists in the stomach of the latter being a simple cavity, while that of the former is a tube. Mr. Gray considers the *Sea-eggs* to be the type of the *Radiata* (Radiated animals). The study of these animals is not of so much importance in a zoological as in a geological point of view, as they are frequently found perfect in a fossil state; such specimens presenting always a crystalline appearance, when the spines or any of the hard portions of the external covering are fractured. It is also somewhat singular, that double the number are known in a fossil state as in the recent; which proves that they were much more abundant both as to number of specimens (as will be presently observed), to size and kinds, than those now existing in the waters. They are calculated to bear from their architectural form, viz., that of the dome or ball, considerable pressure, and are often found with the shell entire even though the whole of the spines and tubercles have been worn off by the agitation of the sea and the rolling on the beach.

The shell or covering of the Sea-eggs is very complicated in its structure. When the animal is alive, the numerous portions or *tesselæ* are distinct from each other fixed to a membrane, and capable of being moved by the enlargement or contraction of that membrane. When the animal dies, the membrane contracts, and the several portions are in direct contact one with the other, giving the shell the appearance of being solid in its nature. The shell is divided into ten gores (*ambulacræ*), each of which is subdivided, forming twenty; each gore is further divided transversely into a number of pieces, and every alternate one is perforated with holes, through which the feet or tentacles pass—there are 300 pieces not pierced, and 600 which are pierced—making in all 900; the pieces without the holes are much broader than those possessing them.

Ehrenberg has detected at the extremities of the rays of star-fish, red points, which he describes as their eyes. At the top of the area of the shell of the *Sea-egg*, five holes may be observed, which are the extremities of the oviducts. Mr. Gray very ingeniously proved by means of a card-board apparatus, that a star-fish may be considered to be nothing more than a sea-egg flattened out, and that a sea-egg, on the contrary, is a star-fish folded up.

The Sea-eggs have at their under side an opening or mouth, around which is fixed moveable portions of a bony structure, called jaws. They are five in number, and consist of triangular bones, having a sharp enamelled edge, which is reproduced as it is worn away. The extremity of each jaw farthest from the cutting edge is soft and silky, but it gradually increases in hardness as it arrives towards the cutting end. There may be also observed five portions of the same structure as the shell within the mouth, serving for the attachment of muscles to work the jaws in different directions.

On each of the separate pieces mentioned above, nine spines are found, so that supposing the shell of a sea-egg to be formed in round numbers of 1,000 pieces, each of these animals would be possessed of 9,000 spines, and about 4,000 feet. The spines vary much in size and form in different genera. They are always fixed to a rounded tubercle by means of muscular fibres, which arise from ridges on the shell around their base, and as these spines are perfectly under the control of the animal, they use them for progression, for burrowing in mud, &c. The sea-eggs of the older world must have been considerably larger than those now existing, judging at least from a fossil spine from the Continent, in the collection of the Marquis of Northampton, which measures more than three quarters of an inch in diameter, and 18 inches in length. Mr. Gray alluded to the supposed parasites of Müller, found generally around the mouth of the sea-egg, but which he, with others, is inclined to consider to belong to the organization of the animal: they are also found in star-fish.

The Sea-eggs and their allies assume various forms and shapes; some being round, others flat, like money, others being notched in the margin, &c. The flatter kinds are strengthened within by numerous portions of shelly matter, arranged in the form of pillars or supports, to prevent them from being broken by the agitation of the menstruum in which they are found.

We did not perceive any thing worthy of notice on the library table.

Mr. Alfred Smee recently delivered a lecture on the laws regulating the Voltaic Deposit of Metals; or, in other words, upon the laws of Electro-Metallurgy. He commenced by recalling to the recollection of his audience an experiment shown by Prof. Brande on a previous evening, that the metals were thrown down from their solutions at the negative pole of a galvanic battery. The differences produced by variations in the galvanic current were next adverted to, and the reduction of the metal was shown in the same decomposition cell to be very different with different amounts of galvanic current. The lecturer next exhibited solutions of sulphate of copper of unequal strengths, in which two copper poles, connected with a platinized silver battery, were placed, on the negative pole of which the metal was thrown down of different qualities. The general principle drawn from these experiments is, that the power of the battery or the galvanic power must be regulated to the strength of the metallic solution. The various kinds of deposits were next adverted to,—the black powder was shown by a long piece of platinized silver—the reguline metal, the type of which was a hammered electrotype plate—the crystalline deposit, a plate of which broke to pieces with the slightest touch. To obtain the powder, such a quantity of electricity in relation to the strength of the solution must be employed, that hydrogen is evolved from the negative plate in the decomposition apparatus. Three varieties of the powdery deposit were then briefly adverted to, as well as its application to the formation of a galvanic battery when deposited upon plates of metal. The reguline metal was shown to be obtained by regulating the power of the battery to the strength of the solution, so that hydrogen is below the point of evolution from the negative plate. This law belongs to all metals and all metallic solutions, and the fact was shown at the lecture with gold, silver, copper, and iron. The reduction of gold with relation to gilding was explained, and a silver spoon was gilt in the presence of the audience, with the potassa solution of the oxide of gold. Several silver forks and spoons, and a sugar basin, gilt of an excellent color by this process, were exhibited, and the lecturer stated that it was coming into use at Clerkenwell, which would materially save the health of the workmen, who suffer severely by the mercurial fumes of the present process. The reduction of silver was next exhibited from the ammonio carbonate, and several medals made in this way were shown. A large candelabrum candlestick, and other articles, were exhibited, plated by Elkington, of Birmingham, by a process patented by him. The reduction of iron was shown on a polished copper plate, which was connected with the zinc of a small tumbler platinized silver battery. Whilst an iron nail was connected with the silver of the battery, the copper was put into a solution of the proto-sulphate of iron, and, on being removed, had all the appearence of a polished steel plate. The crystalline deposit was next made the subject of examination: it was described to arise from a deficiency of electricity to the strength of the solution. The application of crystalline copper for ornamental purposes was briefly mentioned, and electro-coppered leaves, baskets, and plaster medallions exhibited. The lecturer next described the means by which the uniformity of the strength, and the acidity of the solution, may be maintained; and stated the porous tube apparatus was not at all adapted for the refinements of electro-metallurgical operations. The decomposition apparatus where a piece of metal, similar to that reduced, is made the positive pole, to be dissolved to the same amount that the metal is reduced, was stated to be best adapted for the electro-metallurgist. A singular circumstance was noticed to take place on the reduced metal, in certain cases: from a lighter solution being formed, deep grooves or lines are produced, which leave intervening ridges, amounting in some cases to an inch or more in height. The means of overcoming these were briefly detailed; the most important being the position of the cast, and several experiments were shown to elucidate this phenomenon. The regulation of the quantity of electricity may be effected by varying the power of the battery, either by increasing or diminishing its size or by altering its exciting solution. The size of the positive pole will be found, in all cases, to regulate with the utmost exactness the quantity of electricity, and therefore the state of the metal. Sometimes it is even necessary to diminish it to the smallest point, as in the reduction of gold. The distance between the poles and the temperature was noticed as affecting the quantity of electricity. Mr. Smee next described the adhesion and non-adhesion of the reduced metal to the surface on which it was deposited, to be owing to a film of air, which, being present, causes a separation between them, but when removed, adhesion ensues. At the conclusion he again particularly enforced the grand principle, that to obtain any requisite state of deposition, from any metallic solution, from any strength of solution, from any salt, the galvanic power must be regulated to the strength of the metallic solution.—*Athenæum.*

INSTITUTION OF CIVIL ENGINEERS.

March 9. J. Walker, Esq., President, in the Chair.

The following gentlemen were ballotted for and duly elected:—Mr. J. Spiller. as a member; Mr. Taylor of Constantinople, and Mr. Thomas Routledge, as associates; and Mr. J. Pope as a Graduate. The subject of the "Construction of Suspension Bridges" was renewed and discussed. Mr. E. Cowper, in drawing the attention of the society again to the subject, stated that he was a few days back on the Hammersmith suspension bridge, and

that he could, by exerting repeated impulses on the chains, while standing on the bridge, give a very considerable degree of motion to the bridge. Some discussion ensued as to the most effectual method of preventing the motion communicated to suspension structures by the currents of wind, &c., and which had caused considerable damage at the Menai bridge, viz., breaking of the chains at the joints, &c., the result of the continued vibration or oscillation. Mr. Donkin stated as his opinion, that the most effectual method of preventing this oscillation was by a good and complete system of bracing. Considerable discussion then ensued as to the proper definition of the words undulations, oscillations, and vibrations, in which Messrs. Seaward, Hawkins, Cowper, Donkin, &c., took part. Mr. Newton explained the peculiarity of the motions of the wire bridge at Fribourg, which is continually undulating; indeed he could only compare it to the waves at sea; there is scarcely any pendulous play.

An abstract of a paper by Mr. Charles May was also read, "On a new Form of Railway Chair." Mr. Seaward presented the institution with the specification and drawings of Mr. Broderip's patent Trunk-Engine, better of late known as "Humphreys' Trunk-Engine," although the entire merit rests with the former inventor, and which was made known 14 years ago, but the death of Mr. Broderip prevented his bringing the same out. This was shortly afterwards done by the executor, although Mr. Humphreys had taken the credit to himself in 1835. Mr. Seaward said, he brought forward this subject with a view to give the merit of the invention to him who deserved it, and likewise to develope truth. Two other papers were read, on the construction of railway arches and viaducts, by Messrs. Green and Pope.

Mr. Steel, at the suggestion of the president, stated, that he was about to bring out a work on submarine or subaqueous operations, and solicited communications on the subject from the members of the institute.

ROYAL GEOGRAPHICAL SOCIETY.

March 8. G. B. Greenough, Esq., President, in the Chair.

Dr. Willshire, who has just returned from travelling in Morocco, exhibited a series of drawings illustrative of the capital of that empire. Dr. Willshire stated, that he had entered Barbary at Swearah or Mogadore, then visited Maremma, whose situation upon our maps has hitherto been wrongly placed; afterwards passed over to Morocco, whence be was allowed to proceed to the ruined city of Tasremoot in the Atlas Mountains; from Tasremoot he proceeded along the base of this mountain range to Ouıeka; he afterwards returned to the capital of Morocco by the ruins of Roniatz. At Morocco he demanded permission to go to Saffee, a track which had been passed over by one Christian only within the last twenty years, and was allowed to proceed. From Saffee, Dr. W. returned to Mogadore. In the couıse of his remarks, it was shown that the situation of several places lying within the triangle formed by the points Saffee, Mogadore and Tasremoot, as laid down in our maps at present, must be altered. Dr. W. also alluded to some volcanic appearances at Sheshawa, and a remarkable salt lake in the province of Hamar.

Drawings illustrative of Mogadore and the inhabitants of Barbary, were promised by Dr. W. to be laid upon the table at the next meeting.

Captain Washington confirmed the statements brought forward by Dr. Willshire, and stated that he was much gratified at being present on this occasion, as he had visited many of the spots alluded to, some 10 or 12 years since.

Other communications and notices were read connected with geographical science, on which the usual discussion took place.

BOTANICAL SOCIETY OF LONDON.

March 6. W. H. White, Esq., in the Chair.

Mr. Arthur Wallis communicated one of a series of papers, illustrative of the "Flora of the County of Essex."

A paper was read "On the Hair Collectors of *Campanula* (bell flower), and the mode of fecundation of these plants," by M. A. Brogniart, translated from the French, and of which the following is an abstract. It has been long known that the external part of the superior portion of the style and stigmatic branches of *Campanula* were covered with long hairs, very apparent in the flower bud, before the escape of the pollen from the anthers. They are found in all the plants of the family *Campanulaceæ*, with the exception of *Petromarula*. Dec. These hairs, previous to the expansion of the flower, sweep or brush out the pollen anthers; hence their name of *Hair Collectors.* The opinion hitherto entertained is, that these hairs, at the moment that they lose the pollen grains, fall off, and leave the surface of the stigma studded with small *asperites.* Brogniart is however convinced that they do not fall, but that they present a phenomenon, which has not as yet its parallel in the vegetable kingdom. He asserts that these hairs are formed by an external prolongation of the cuticle of the style, and that they are simple, without any trace of joint or chamber, even at their base. Beneath each of these hairs exists a subjacent cellular tissue, a cavity equal in depth to the half or third of the length of the hair continuous with it, and which appears to be filled with the same fluid. This cavity, with the others, is not prolonged beyond the most superficial layer of the style or stigma, and has no relation with the deeper tissues. This arrangement persists until the period for the expansion of the flower, the hairs being then covered with the grains of pollen applied on their surface, and retained in their interstices. But at this period the hairs enter the cavity at their base in the cellular tissue; the terminal half is withdrawn into the half situated at the base of the hair, at the time that this enters its cavity. The summit of the hair which has been withdrawn makes a slight projection above the external surface of the style, and produces the small asperites noticed by Cassini. Sometimes the hair, on thus being withdrawn into itself, carries with it some grains of pollen, which appear to penetrate into the tissue of the style, but which are always in relation with the external surface of the hair, and may be readily removed by a needle or pointed instrument. M. Brogniart, in accounting for this retraction of the hair within itself, and enclosing the pollen, which undergoes no change whatever, is inclined to attribute the effect to the absorption of the liquid contained both in the hair and the cavity at its base; and would thus cause the hair to be withdrawn into the cavity at its base. Brogniart is therefore of opinion that these plants are not fecundated by the means above mentioned; but that in *Campanula* there exist true stigmata on which the pollen is fixed by the moisture which lubricates their surfaces, and that this function is performed in the manner observed in vegetables generally, viz., by the protrusion of the *pollen tubes* between the cells of the cellular tissue of the style, &c., until they arrive at the ovulum, when fertilisation is effected.

ROYAL SOCIETY.

The following are abstracts of some papers recently laid before the Royal Society.

Contributions to Terrestrial Magnetism, by Major Edward Sabine, R.A.—This paper is the second of a series in which the author proposes to communicate to the Royal Society the results of magnetic observations in different parts of the globe, having for their object to supply the requisite data for deducing the numerical elements, corresponding to the present epoch of the general theory of terrestrial magnetism. It consists of two sections; the first comprises the observations of Capt. Belcher, R.N., and the officers of H.M.S. Sulphur at twenty-nine stations on the west coast of America, and the adjacent islands, between the latitudes of 60 deg. 21 min. N. and 18 deg. 05 min. S. The second contains a new determination, by the same officers, of the magnetic elements at Otaheite, made in consequence of the discrepancies in the results obtained by previous observers, and of a note in M. Gauss's Allgemeine Theorie, in which Otaheite is spoken of as a highly important station for the future improvement of the calculations of the theory. Abstracts are given of the original observations which are deposited in the Hydrographic Office of the Admiralty, as well as a full detail of the processes of reduction by which their results have been computed. The values of the horizontal and total intensities are expressed in terms by which the results of observation are immediately comparable with the maps of Messrs. Gauss and Weber in the "Atlas des Erdmagnetismus." By an investigation into the "probable error" of a single independent determination of the magnetic intensity with Hansteen's apparatus, derived from the data furnished by Capt. Belcher's observations, the author shows the extreme improbability that the differences in the results obtained at Otaheite by Messrs. Erman, Fitz Roy, and Belcher, should be occasioned by instrumental or observational error. They are also far greater than can, with any degree of probability, be ascribed to periodical or accidental variations in the magnetic force from its mean value. The only known cause adequate to their explanation is what may with propriety be termed *Station error*; that is, local disturbing influences, in an island composed chiefly of volcanic rocks, and where the spot of observation selected by the different observers may not have been precisely the same. By a reference to the magnetic survey of the British islands, the occurrence of station error is shown to be frequent in countries of far less decided igneous character than Otaheite; and that its existence may always be apprehended where rocks of that nature approach to, or rise through, the superficial soil. The absolute determinations of fixed observatories are as liable to station errors as those of the magnetic traveller, since no continuance or repetition of the observations can lead to an elimination of the error; it consequently presents a practical difficulty to the proposed determination of the elements of the theory from exact observation at only a few selected positions on the globe. The remedy is to be found in the combination of fixed observatories and magnetic surveys: the observations of the survey, being made in concert with, and based on, those of the fixed observatory, will be furnished thereby with corrections for the secular, periodical, and accidental variations of the elements, and will consequently determine *mean* values: and a proper combination of the mean values thus determined, over a space sufficiently extensive to neutralize *district* anomalies, as well as those of a more strictly local character, will furnish, in their turn, a correction for the station error, if any, of the fixed observatory.

On the Calculation of Attractions, and the Figure of the Earth, by J. C. Hargreave. The principal object of the calculations contained in this paper is to investigate the figure which a fluid, consisting of portions, varying in density according to any given law, would assume, when every particle is acted upon by the attraction of every other, and by a "centrifugal force" arising from rotary motion. That such has been the original condition of the earth has been assumed as the foundation of most of the mathematical calculations connected with this inquiry; although the hypothesis itself may admit of doubt. The principal difficulty of this problem consists in the computation of the attraction of a body of any given figure, and composed of strata varying in their densities according to any given law. In solving it, the author follows the steps of Laplace as far as the point where the equation, known by his name, first appears. It has, however, since been discovered by Mr. Ivory, that the theorem of Laplace is true only of spheroids of a particular kind, and consequently it is to this kind that Laplace's solution of the problem is restricted.

The method given in the present paper is not confined in its operation to any particular class of spheroids; the coefficients of the series into which the required function is developed being determined absolutely, and without reference to the form of the spheroid to which they are to be applied. The principal change consists in the different manner of treating the partial differential equation; and its integration, effected by the author, renders the analysis more direct, the operations more simple, and the theory complete.

On the Production of Heat by Voltaic Electricity, by J. P. Joule, Esq.—The inquiries of the author are directed to the investigation of the cause of the different degrees of facility with which various kinds of metal, of different sizes, are heated by the passage of voltaic electricity. The apparatus he employed for this purpose consisted of a coil of the wire, which was to be subjected to trial, placed in a jar of water, of which the change of temperature was measured by a very sensible thermometer immersed in it, and a galvanometer, to indicate the quantity of electricity sent through the wire, which was estimated by the quantity of water decomposed by that electricity. The conclusion he draws from the results of his experiments is, that the calorific effects of equal quantities of transmitted electricity are proportional to the resistances opposed to its passage, whatever may be the length, thickness, shape, or kind of metal which closes the circuit: and also that, *cæteris paribus*, these effects are in the duplicate ratio of the quantities of transmitted electricity; and, consequently, also in the duplicate ratio of the velocity of transmission. He also infers from his researches, that the heat produced by the combustion of zinc in oxygen is likewise the consequence of resistance to electric conduction.

A TRIP TO THE NORTH POLE.

The *Gazette du Midi* gives the following extraordinary account of an alleged visit to the North Pole, by some Russian scientific explorers. The account is taken from a St. Petersburgh periodical, *Le Journal Scientifique et Littéraire*, and the *Gazette* appears to credit the statements. The notion of a *frozen flame* seems to surpass Baron Munchausen's veracious statement as to frozen sound; but as the account appears in a publication professedly devoted to science, and as the people of St. Petersburgh may be supposed to know more about the effects of cold than we can in this warmer climate, we give the narrative as it appears in the *Gazette du Midi*. Our readers may believe as much of it as they please; we confess we want faith.

A St. Petersburgh periodical, *Le Journal Scientifique et Littéraire*, publishes a very extraordinary narrative of an expedition to the Arctic regions, under the command of M. Nidjnei Nitigoïwosnesenk. If the narrative be not exaggerated, that traveller would appear to have reached within a few wersts of the pole.

The occurrences he reports are of so marvellous a nature that we certainly cannot vouch for their veracity; but they are too curious not to be laid before our readers, and we shall add that M. Nidjnei Nitigoïwosnesenk's *memoire* has been submitted by that traveller to the academies of Moscow and St. Petersburgh. It is difficult to believe that anybody would have ventured to call the attention of two such respectable bodies to facts not offering every guarantee of truth; and an additional proof that fiction has nothing to do with this wonderful narrative is, that M. Nidjnei and his companions, having arrived at St. Petersburgh on the 15th of December, a deputation from the Academy went out to receive them, and the Emperor was pleased to confer the Order of St. Wladimir, of the 2d class, on the head of the expedition.

"Embarked in the Catherine II. frigate, we arrived on the 5th of September at the northernmost point of the Samoides' land. We were obliged to give up passing any further owing to the enormous icebergs which began to obstruct our course. The frigate was moored in a sort of creek, which we had the good fortune to discover as we followed the coast, and we immediately betook ourselves to preparations for continuing our exploration by other means. The sledge we had got built with that view at St. Petersburgh was put together on deck, and filled with provisions and instruments indispensable for the hazardous enterprise we were about to venture upon.

"At about the eighty-eighth degree of latitude, all the dogs that had hitherto dragged our equipage were frozen, so that in order to advance we were compelled to use our long iron hooks, which was a dreadfully fatiguing task. The cold made us suffer horribly, despite of the seventeen bear skins with which we had each of us taken the precaution to cover ourselves. It was also in the same latitude, or thereabouts, that chance yielded us one of the most curious discoveries that have enriched the physical sciences in latter times. It occurred thus: for some days we had made no fire for want of wood, when in searching our box of provisions I found some Lyons chestnuts which M. Arago had sent me as a *souvenir*. I took it into my head to roast them. We put together some shavings which we still had, and kindled them. A bright flame forthwith arose, and we were anticipating the sweet sensations it was about to yield us, when suddenly an incomprehensible phenomenon manifested itself. The flame at first so bright and crackling, seemed struck with immobility, and was gradually covered with a solid crust . . . . it was congealed!

"Our astonishment baffles description. (A scientific description of the ice thus produced then follows). I broke a bit of it and put it into my mouth. Contrary to my expectation, the sensation which resulted was most agreeable; just fancy a little taste of barley-sugar extremely refreshing, though accompanied by a light burnt smell. I am persuaded that when such ice shall be produced by artificial means, confectioners will turn it to great account.

"A little further on another phenomenon, not less remarkable, awaited us. We had for some time perceived an increased rapidity in the progress of our sledge, though we used our iron hooks but little. The phenomenon was soon explained: one of us having dropped his hook, the moment he attempted to pick it up we saw it gradually remove from us, flee before us, and ultimately whiz as it split the dense atmosphere around us. Though already accustomed to the wonders which those mysterious regions had presented to us, as it were, at every step, we stood mute with astonishment, but were soon roused from our amazement: our sledge, which was almost wholly made of iron, seemed pushed on by a fatal, irresistible, and invincible power, such as that which draws a light boat towards a cataract; we tried to stop it, but could not succeed, and were compelled to leave it to the mercy of heaven.

"The magnetic power of the pole produced its effect, and, after a few hours of that fantastic progress, we were enabled to perceive by the light of an aurora borealis the sombre and mysterious extremity of our globe. It consisted of enormous mountains, probably of pure loadstone, divided into huge strata, of various colors, green or blue. One would have fancied the back of a gigantic zebra was rising before us. Alas! unless Providence vouchsafed us unhoped-for assistance, we must soon be dashed to pieces against it. Impelled by the proud demon of science we had tempted Heaven, and already did we feel its hand suspended over our heads ready to crush us.

"Nevertheless, thus isolated in that vast frozen solitude, and fatally dragged to destruction, we were calm and resigned, so great is the power of the grand mysteries of nature over man! Some tears, only, flowed in silence, and I heard beloved names uttered, when, suddenly, a sort of barrier of icebergs, heaped over one another, made us deviate from our course, and at the same moment, and in a few seconds, a force as powerful as that which had made us before devour space in front of us, made us roughly recede . . . . We had just fallen into a negative magnetic current. . . . . We were saved, and saved carrying away with us the most awful secrets of nature. It was enough to run mad with joy. We raised our hands to Heaven."

The *Journal Scientifique et Littéraire* announces that the whole *memoire* of this marvellous expedition is to be shortly published.

SCIENTIFIC MEMORANDA, AND NOTES ON ART.

The Falls of Niagara.—We are informed by the latest advices from North America, that the falls of Niagara, which have been considered one of the wonders of the world, have been destroyed. The rocks over which the water fell perpendicularly have given way, and the immense sheet of water is now broken, and forms a great cascade for nearly a mile. The first sympton of the destruction took place on the morning of the 7th ult. The rocks kept giving way for some days afterwards, until the whole of those, over which the water fell on the Canada side, were swept away. The rocks of the American fall remain intact, but the quantity of water has greatly diminished, as a larger opening is now afforded for the descending current. This fall of the rocks is an exemplification of the gradual wearing away, which has been going on for ages. The water must have originally fallen over the ridge of rocks near Queen's Town, a distance of seven miles from the present point where the waters fall. The water has thus worn away a deep channel, until the falls have gradually retrograded. In the course of time, the rocks will no doubt be entirely worn away, and the course of the Niagara river from Lake Erie to Lake Ontario, will be a rapid current, instead of a succession of falls and breakers; and the upper lake will be drained.

Government Museum of Economic Geology.—The arrangements for the opening of this new institution are progressing but slowly, and nothing has yet been decided as to when it will be thrown open to the public. It occupies the two corner houses, Nos. 5 and 6 in Craig's-court, which have undergone extensive alterations for the purpose. In addition to several rooms which will be devoted to the arrangements of the cases and cabinets composing the museum, there is a well-stored laboratory for instruction in practical analysis upon the ground floor. A large and prominent part of the collection in the museum is the extensive series of specimens of stone obtained by the commission for investigating the best material for building the new Houses of Parliament. The depository for mining records, forming another branch of the establishment, is already rich in statistical annals and details connected with the mining industry of the kingdom. Each department will be open to the public on three or more days in the week under certain restrictions.—*Morning Post.*

Royal Institute of British Architects.—On Monday night a meeting of this society was held. Mr. Godwin, jun., made some observations on several fires which had occurred in Manchester within the last few weeks, supposed to have been caused by hot water pipes used to heat the buildings, viz.: at Messrs. Barbour and Brothers, the Natural History Society, and others. After explaining the different systems which are employed, and showing what heat might be imparted to water under pressure, Mr. Godwin urged the necessity of an inquiry into the subject. A long and animated conversation ensued, which led to an arrangement that the matter should be further pursued. The medal offered for the best essay on cast iron roofs, was awarded to Mr. Edward Hall. Mr. Fowler, the honorary secretary, then read a paper on the antiquities in Wisby, in the island of Gothland, communicated by Mr. J. White. Some of the churches there are attributed to the eleventh century; for example, All Saints to 1030, the Holy Ghost to 1046, and St. Drothen to 1086. On what ground, however, does not seem yet to have been satisfactorily shown.

Operation for the Cure of Stammering.—Mr. Yearsley, an English surgeon, has adopted a plan for the cure of stammering, differing materially from that of M. Dieffenbach, of Berlin, which we recently noticed. M. Dieffenbach considers that stammering depends on what he terms a "deviation of the tongue, and contraction of certain muscles, which prevent it from striking the palate freely during the articulation of certain sounds." For the cure of this malady he divides the genio-glossi muscles which attach the lower part of the tongue to the sides of the jaw. Mr. Yearsley considers that stammering is caused by an obstruction to the egress of air from the lungs, in consequence of the approximation of the dorsum of the tongue, the arches of the palate, and the uvula, so as completely to obstruct the passage of air from the pharynx to the mouth. The operation which Mr. Yearsley has introduced for the cure of this defect in articulation consists either in an excision of the uvula altogether, or only a portion of it, in conjunction with the tonsils, according to the peculiarities of each case. A numerous body of scientific men and professional gentlemen assembled on Tuesday at Mr. Yearsley's residence for the purpose of seeing this operation performed. Mr. Yearsley submitted to the meeting 12 patients upon whom the operation had been performed with complete success. Twenty-six cases underwent the operation on Tuesday. The greater number of these were severe cases of stammering. The operation was performed with skill, and the relief which it afforded appeared to be instantaneous. Individuals who were scarcely able to articulate half a dozen words prior to the operation afterwards spoke with a wonderful degree of fluency. The operation appeared to give but little pain.

No patient on whom Mr. Yearsley has operated has suffered a relapse. It should be stated, in justice to Mr. Yearsley, that he is the first surgeon who has ever performed this operation.

The Queen's Presents to the British Museum.—Among the presents recently received by the trustees of the British Museum are several interesting specimens of the workmanship of the aboriginal inhabitants of New Caledonia, Isle of Pines, &c., from her Majesty. These articles have been deposited in cases 33 and 34, in a spacious apartment at the top of the principal staircase, and comprise portions of the costume and furniture, with spears, hatchets, bows and arrows, and other implements of war, showing great taste and mechanical skill. The objects excite much attention, especially a lady's bonnet from Navigator's Island, most exquisitely formed of small pieces of tortoise-shell, and resembling in shape the prevailing fashion. Her Majesty has also been a most liberal contributor to other departments.

To Produce Light by Friction.—This may be done by rubbing two pieces of fine loaf sugar together in the dark—but in a much greater degeee by two pieces of silex or quartz. By this means one may distinguish the time of night hy a watch—but what is more surprising, the effect is produced equally strong by rubbing the pieces of quartz together under water.

Force of Gunpowder.—The projectile force of gunpowder depends on the instantaneous conversion of the solid materials into a permanently elastic fluid, which is at the same time greatly increased in volume by the intensity of heat (which I have experimentally found, even on a very small scale, sufficient to melt copper instantly). Now it has been ascertained that one cubic inch of gunpowder is converted into 256 cubic inches of permanent gases when cooled down to the temperature of the atmosphere; and Dr. Hutton has calculated that the increase of volume at the moment of ignition cannot be less than eight times; therefore, a cubic inch of gunpowder at the time of explosion, if confined, exerts a pressure of at least 2,000 pounds on the square inch in every direction, which may at once account for its extraordinary power.—*Engines of War, by Wilkinson.*

Effect of Mountain Air on Man.—One of the most interesting expeditions, says Dr. Meyen, was one to the mountains of Peru, a service of considerable danger, on account of a complaint which almost invariably attacks the traveller during the ascent. The symptoms are described as follows: —We were tormented with a burning thirst, which no drink was able to assuage; a slice of water melon, which we had brought with us, was the only thing we could relish, whilst our people ate garlick and drank spirits, maintaining that this was the best way to guard against the effects of the journey. We kept on ascending till two o'clock in the after noon. We were already near the little ridge which extends W.S.W. from the summit of the mountain (the volcano of Areguipa), and we could even distinguish the little stones upon the summit, when our strength at once abandoned us, and we were overtaken by the disease *sorocco*. The nervous feverishness, under which we had suffered from the first, had been gradually becoming worse and worse; our breathing became more and more oppressed, fainting, sickness, giddiness, and bleeding at the nose came on; and in this condition we lay a considerable time, until the symptoms grew milder from repose, and we were able to descend slowly.—*Jameson's Journal.*

Nutmeg is the fruit of the *Myristica Moschata*. The tree is a native of the Molucca Islands; but has been nearly extirpated by the Dutch, except in Sumatra and Banda, where enough is raised to supply Europe. The covering of the nut is known by the name of *mace*. The nutmeg varies in size and figure. It is furrowed on the outside, and greyish brown internally. Those that want white streaks are the best. From the experiments of Neumann we learn that the substance contains two species of oil: a volatile oil to which it owes its peculiar smell and taste, and which in his trials amounted to about 1-32d part of the nut; and a solid fixed oil resembling wax, and amounting to about 1-3d of the nutmeg. He detected also a quantity of gum, and it is probable from the appearance of the kernel, that it contains likewise starch. By expression the solid oil is separated, and mixed with the volatile oil. In that state it is sold under the name of *oil of mace.*—*Thomson's Vegetable Chemistry.*

Results of Marcet's Experiments with Mushrooms on Air, &c. —1st. Mushrooms whilst growing in atmospherical air produce upon it changes very different from those which are effected by green plants, placed under similar circumstances. Mushrooms very speedily vitiate the air, both by absorbing its oxygen, to form carbonic acid gas at the expense of the carbon of the vegetable, and also by the disengagement of carbonic acid gas formed on all occasions when the experiment is conducted for a sufficient length of time.—2d. The changes which the atmospheric air undergoes from the growth of mushrooms appears to be the same both day and night.—3d. If fresh mushrooms are placed in pure oxygen, a great part of this gas disappears at the end of some hours. A portion of the absorbed oxygen combines with the carbon of the plant, whilst another portion appears to enter into the vegetable, and to be replaced, in part at least, by the nitrogen disengaged from the mushroom. 4th. Fresh mushrooms, by remaining for some hours in pure nitrogen, change very little the nature of this gas. The only effect produced is confined to the disengagement of a small quantity of carbonic acid, and in some cases to the absorption of a very trifling quantity of nitrogen.

Carpets.—The Brussels carpet is distinguished from the common one by having a raised pile, and by the circumstance that the figures and colors are entirely produced from the warp. The pile is raised by inserting a wire between the body of the warp and the previously raised coloring threads. These threads descend, and are fixed by the woof, and after a few repetitions of the process the wires are withdrawn. The Wilton carpet differs only in this, that the pile is made somewhat longer, and cut in the manner of velvet. Were the colored warp, however, raised into pile at each stroke, the web would have simply a striped appearance; and if it were raised only at intervals, the figure would be given in relief, but would still be merely striped. In order to produce a properly colored pattern, several colored yarns are arranged, so that any one of them may be raised into pile between the same two permanent warp threads. Their number is generally five, so that by their irregular ascent to the surface the striped appearance is almost broken up. Still, however, the web is essentially striped, and though the designer be not nearly so hampered as in the Kidderminster texture, he is still seriously incommoded in his choice.—*Sang on Carpet Manufacture, in Jameson's Journal.*

Canada Balsam is obtained from the *Pinus Canadensis* and *Calsamea*. It has a pale yellow color, is transparent, fluid, but adhesive and capable of being drawn out into threads. Its smell is much more agreeable than that of turpentine in general.

Copyright of Last Editions.—In the Vice-Chancellor's Court on Monday, arguments of counsel were heard to dissolve an injunction which had been granted against Messrs. Fisher and Co., booksellers, to prevent them from publishing advertisements and labels to their edition of Scott's Bible, which led the public to believe it contained the last additions and notes of Mr. Scott, which were contained in the fifth edition of the work published by Mr. Seeley. The Vice-Chancellor refused to dissolve the injunction, but he thought that a trifling alteration in the labels and advertisements would make them unobjectionable.

Mineral Products of Southern Peru.—Arica, rendered by its position the natural *entrepot* of all the merchandise destined for South Peru and Bolivia, and of the products exported from these countries, became at a certain epoch one of the most important points of the Pacific Ocean. From Cuzco, Arequipa, and that part of upper Peru now Bolivian, the inhabitants went there to purchase the products of European industry, the quicksilver and all the articles necessary for working the mines of Potosi, Lipes, Oruro, and La Pas. The famous galleons, freighted with the produce of these mines and money in payment of foreign wares, sailed yearly from this port for Spain. Those days of prosperity are past. For a long time past the insalubrity of the climate has caused a reflux of the Spanish population upon Tacna, at thirty-five miles from Arica, and half the distance from the sea. Iron, unworked, is furnished from England, Spain, and Sweden, upon which a duty of one dollar per box is charged. Earthenware from England and France. cutlery, English and German, glassware a good deal from Germany. The exports from Arica are composed for the most part of Bolivian products. A speculation was tried once by some parties, of shipping silver ore at Iquique, the produce of the province of Tarapaca, but the results were not encouraging, and the speculation was abandoned. The principal Bolivian products exported from Arica are quinquina (jesuit's bark), copper, bismuth, and wool. In respect of copper, the working of the mines of Corocoro, in the department of La Pas, so rich from the quality and quantity of their mineral, which yields from 80 to 90 per cent. of pure metal, has been pursued of late years with great activity, and the produce in consequence has been rapidly augmented. At the close of 1832, the rough ore was selling in Arica at eight dollars the quintal; but this was not properly a fixed price, as at that time there were few speculators in the article. So far back as 1836, a quantity equal to 3161½ quintals was despatched to this country, but more by way of trial than speculation. Oruro furnishes bismuth of a dull appearance, and Guanani a bright bismuth, which, at the commencement of 1839, was selling at Arica at 10 to 11 dollars the quintal for the first, and from 12 to 13 for the second of these sorts. In 1836 the export amounted to 3,280 quintals.—*Glamorgan Gazette.*

VARIETIES.

Port of Liverpool.—The duties received at the Custom-house of Liverpool in the year 1840 amounted to no less than four millions seven hundred thousand pounds sterling, and yet, on the accounts being subjected to the usual rigid examination by the proper officers in London, the only error found was under twenty shillings.

Steam-Engines for the Navy.—Much activity now prevails at the factory of Messrs. Seaward and Co., at Limehouse, in fitting out the engines and machinery for the Ardent and other steam frigates lately towed up the river, which are to be equipped with all possible expedition for the Royal Navy. The Ardent is in a very forward state, and will soon be ready for sea.

The United Steam Frigate Missouri.—*From the New Orleans Picayune.*—This magnificent vessel is constructed principally of live oak from Attakapas, in this state, and her entire cost is 500,000 dollars. In her rig she will resemble a handsome bark, and her builder has constructed the hull so admirably as to render her, as a sailing vessel, a No. 1 of the United States navy. She will sail the greater part of the time, as her bunkers only carry about 800 tons of coal, or sufficient for 20 days' steaming. Her spars, particularly the foremast and mainmast, are as heavy as those of a first class frigate; and she is so constructed as to be able to ship and unship her paddle-wheels with the greatest facility. She is pierced for 26 guns, but will carry but 18—6 aft the wheel-house, and 3 forward of it on each side. She is to carry two 10-inch guns forward, which are to traverse the greater part of a circle on a swivel; these two guns will be able to carry shot nearly 100 pounds weight, as 8 inch guns carry 64lb. shot. The other 16 guns are to be 8-inch bore. On account of the result of various trials, the whole of her ordnance is to consist of Paixhan guns. She will be ready for sea in July next.

How to settle a Scientific Dispute.—Two learned physiologists at Glasgow, having a dispute as to a discovery in minute anatomy, to which both laid claim, determined last week to settle the questions with a brace of pistols. The parties met and fired twice without effect, though the seconds were nearly shot. The original claimant of the discovery had then his rights admitted, and both left the ground after having thus settled the matter.

New Pier at Chelsea.—Lord Cadogan has given instructions for a splendid pier to be erected in Cheyne-walk, Chelsea, opposite the place where the Bishop of Winchester's palace formerly stood, and Mr. Lewis Cubitt has taken the land to open a new street from the water up into the King's-road. The iron steam boats, after Good Friday, will commence running to Battersea, Wandsworth, and Putney.

Louis Philippe and the Daguerreotype.—On Saturday, at a quarter before eleven, the King, accompanied by the Queen, M. Daguerre, General Haymés, aide de-camp, and Baron Fain, secretary, appeared in the Pavillon de l'Horloge in order to be Daguerreotyped. His Majesty, with his face turned to the sun, sat three minutes without moving a muscle. He was in a chair of blue satin, with gold border, and one foot on a violet-velvet cushion. The King had on a black coat, white cravat, and no hat. A new Daguerreotype on a fresh model was used for the purpose.

Discovery in York Minster.—A curious discovery was made one day last week, in York Minster, of some ancient brass and silver gilt candlesticks, salvers, &c, which had formerly been placed upon the altar. An old box attracted attention, but no key to open it could be found. It was ordered to be broken open, when the long-missing treasure presented itself to view.—*Tyne Pilot.*

New Patents.—It appears that 446 patents for new inventions were granted during the last year, so that in stamps only government received £13,380. In the present century 6,277 inventions have been patented.

The New Reform Club House.—The following description of the application of modern inventions to comfort and accommodation as exhibited in the fitting up of the New Reform Club House, is given in the *Spectator*—The arrangements for the comfort of the members, and the convenience of the attendants, are as complete as science and art can render them. Ranges of bath-rooms, dressing-rooms, waiting-rooms, steward's-rooms, &c., occupy the entresol; and the basement is devoted to the culinary department, which is on a grand scale of completeness. A beautiful little steam-engine, of five-horse power, supplies the motive force! it raises water from a well of 217 feet deep to the dormitories at the top of the house; it sets in motion a fan that circulates through all the buildiog a supply of fresh air, warmed by an application of waste steam; and it works the various "lifts" by which fuel, viands, dishes, &c. are sent up and down to and from the different rooms. The batterie de cuisine presents a formidable array of stewing-stoves, boilers, and hot closets, ice-wells and cool pantries, and two enormous fire-grates, each big enough to roast an ox whole. Altogether, the Reform Club is, perhaps, the completest specimen of domestic architecture in the kingdom; the architect, Mr. Barry, has naturalised in England the Italian palazzo, by combining with its solid magnificence of style and superb taste in ornament those luxuries of convenience which our cold damp climate and indoor life render essential to domestic comfort.

Percussion Locks for the Indian Army.—The Court of Directors have, we understand, resolved on the introduction of percussion locks in the fire-arms of the Indian army. 10,000 muskets on this principle were shipped for Calcutta in August last, and 100,000 in all bad been ordered for the Bengal army alone. The greater part of these had been originally meant as flint-lock arms, but were afterwards altered, one parcel having been fitted up with lumps brazed on for the nipple, a plan the suitableness of which for the climate of India having appeared doubtful, the remainder had screw-plug nipples fitted on. For Bombay 17,000 muskets, 1,200 carbines, 500 fuzees, 100 blunderbusses, and 80 wall pieces had been ordered.—*Bombay Times.*

Literary Fund Society.—The anniversary meeting of the above society took place on Wednesday at the offices in Great Russell-street, Bloomsbury. The auditor's report stated that the sum of £888 had been distributed in grants to distressed authors, their widows and orphans, which made the total amount expended for that purpose since the formation of the society £27,043 9s. The subscriptions, donations, &c., received during the past year amounted to £890 15s. 6d. The Marquis of Lansdowne was re-elected president, and the vacancy of vice-president, by the death of Lord Henley, was filled up by the appointment of Henry Hallam, Esq., and the meeting separated.

Explosion of Fire Damp.—The *Sheffield Patriot* states that an accident of a very frightful nature took place on Monday, at the Park Colliery. An explosion of fire-damp occurred in the soap-house pit, belonging to the Sheffield Gas Company. Six individuals were sufferers by this calamity; one of them was very severely injured about the body, and presented a dreadful spectacle. It was judged best immediately to convey him to the infirmary, where he lies with scarcely a hope existing of his recovery; three others are also much burnt, two only slightly scorched, and one escaped unhurt.

The Sultan's Appreciation of Musical Talent.—The *Commerce* states, that the Sultan has just conferred the order of Nitscham Iftikar in brilliants on the celebrated composer Donizetti. The brother of this distinguished composer (adds the *Commerce*) is the director in chief of the Sultan's music, and that European music has been introduced into the Turkish regiments by this artist.

New Guns for the Navy.—A proof took place on Monday at the Butt in the Royal Arsenal, Woolwich, of two 56-pounder guns (Monk's pattern), four 68-pounders, and eight 32-pounder guns. There were also four proofs on different days last week, and the supply recently received for Her Majesty's service has been considerable, especially of guns of large calibre. About 90 additional workmen will next week be added to the number already employed in Her Majesty's dockyard at Woolwich, and the greatest activity prevails in every department of Her Majesty's service at Woolwich.

A Man tried for Bursting a Steam-boiler.—At Hertford assizes on Saturday, Thomas Bowler, the engineer in the employ of Mr. Magnay, paper manufacturer, at Mill Hill, Rickmansworth, was indicted for having wilfully caused the boiler of the steam-engine to burst. The boiler was not calculated to bear a higher pressure than seven pounds to the square inch, but it was proved that the prisoner had put a weight on the safety valves so as to raise the pressure of the steam beyond that point; the consequence was that the bottom of the boiler was blown out. There was no evidence to prove that the damage was done intentionally, though the prisoner had acted imprudently and contrary to orders; he was therefore acquitted.

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Port, from the wood	30s.
Ditto ditto, 4 years in bottle	42s.
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Ditto, superior old	42s.
Masdeu, from the wood	28s.
Old Crusted ditto	36s.
Marsala, best quality	24s.
Cape ditto	18s.
	per gal.
Cognac Brandy	28s.
Rum	14s.
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THE FUNICULAR MACHINE.

In addition to the six modes of action which are usually called the "mechanical powers," others have of late been classed with them, which are perhaps as much entitled to be reckoned separate powers as several of those that are generally so recognised. The funicular action, or "funicular machine," as it has been called, is the most remarkable of these additional "powers," and, apparently at least, it bears a distinctive character. We propose, therefore, to consider the nature of this action, and to examine whether the principle on which it depends be or be not distinct from that of the other mechanical powers.

In our former consideration of the action of the lever, wheel and axle, pulley, inclined plane, screw, and wedge,* we undertook to show that they may be all resolved into two simple actions—those of the lever and the inclined plane. It is our intention now to prove, that the funicular action is also a modification of the lever, with the disadvantage of the power acting transversely to the resistance, and by this means occasioning a great loss instead of producing a gain of power.

It may, perhaps, be necessary, in the first instance, to explain to some of our readers of what the funicular machine consists. It is strictly applicable, as its name implies, to the employment of cordage; but the same effects occur, with greater variations, when stiff rods are used instead of flexible cords. This machine acts in the following manner:—when a cord is stretched tightly between two points, and it is then pulled at right angles by another cord attached to its centre, the fastenings to which the two ends of the tightened cord are attached are drawn powerfully towards each other on the first exertion of the moving force. The amount of power diminishes as the angle which the cord pulled makes with the tightened one departs more and more from a right angle. If the force were continued, that angle would gradually become more obtuse, till at length the two cords would form one straight line, and the mechanical effect would be the same as pulling at a single string.

There is one peculiarity attending the action of the funicular machine, which is, that the mechanical effect varies greatly at the different points of action. The greatest mechanical advantage is attained when the two strings are acting at right angles. In that position the centre of the string may be drawn considerably out of the straight line without making the two ends approach perceptibly. As the action continues, the string pulled moves through less space compared with the diminishing distance between tho two ends of the cord, until it arrives at a point where the motions correspond in amount, and then the mechanical effect of the machine is neutralised. After passing that point, the power acts to disadvantage, for it moves through less and less space compared with the motion of the two ends, until its effect is entirely lost in producing motion in the former course, and the power acts only in the line of its own direction.

Some writers have attempted to explain the cause of the power gained by this machine, by attributing it to the "tension of the rope," which, it would appear, is supposed to possess some inherent properties capable of producing mechanical advantages. This opinion is, however, refuted by the fact, that the same effects are obtained by the use of two rods jointed in the middle, where the power is applied. In such a case, therefore, there can be no tension, and the rationale of the effects must be otherwise explained. We think this may be done by referring the action of the funicular machine to the principle of the lever.

In our former remarks on the properties of the lever, we stated that the three points of bearing, viz., the fulcrum, the resistance, and the power, were all convertible, according to the manner in which the instrument was used; so that in some instances it might be difficult to determine which point of bearing was the fulcrum, which the resistance, and which the power. When, for example, a weight is attached to the middle of an inflexible rod, each end of which rests on a prop, the weight may be either the power or the resistance, or either end may be the fulcrum or the power, according to the manner in which the power is applied. The pressure of such a weight on the two props, when the rod is stationary, would be perpendicular; and, if the weight were at an equal distance from the two, the pressure on each prop would be equal; that is to say, the amount of the weight would be divided between them. Were the weight removed nearer to one prop than to the other the amount of pressure on the prop nearest to the weight would be increased. If the weight were five inches distant from one prop and twenty from the other, then the perpendicular pressure on the prop which supported the shorter arm would be four times as great as on the other; that is, if the weight were 100 lbs. they would be in the proportion of 80 to 20.

If the rod were jointed, the direction of the action would be changed; but the principle on which the action depended would remain the same. The pressure which was before distributed by the inflexible rod to the two props perpendicularly, would be directed towards the point of bearing of the weight; but the action of the weight on the two points of suspension would be relatively the same. If the two ends of the jointed rods were fixed to the points of suspension, these points would be drawn nearer together in proportion to tho deviation of the jointed rods from a straight line. The amount of power gained by this action, supposing there were no loss by the transmission from a vertical to a horizontal direction, would be in proportion to the spaces relatively described by the moving power and by the points to which the ends of the rope or rods were attached.

The advantage thus obtained depends, as we contend, on a modification of lever power; though the leverage operates differently from any of the common forms on which it is displayed. In order to show the similarity of principle between the two implements, we will consider the action of a funicular machine composed of two jointed rods, and we shall view these rods as a combination of two levers. To simplify the explanation we will examine the action of each rod separately, for if it can be shown that the action of each singly when thus employed is that of the lever, their combined actions must also be admitted to partake of that character.

When a lever bar rests against any upright support at an angle with the horizon, and a force be applied on any part of it perpendicularly, the action or pressure that ensues is clearly that of the lever. If the force be applied at the middle of the bar there will be an equal pressure produced at each end; but in proportion as the power point approaches the upper end, the mechanical advantage increases until it reaches

* Inventors' Advocate, Nos. 27 to 30.

the upper end of the bar. The mechanical advantage will also vary according to the angle of the bar; the greatest power being obtained, in overcoming a lateral resistance at the lower end, when the angle with the horizon is the smallest.

This disposition of power in reference to the resistance and the fulcrum, would represent a lever of the second kind. The resistance to be overcome is at the end resting on the ground; the fulcrum is the support against which the upper end rests; and tho power acts either between the two or at the fulcrum. The fulcrum and the point of resistance are, however, in this case reciprocal terms, for either end may be considered the resisting force or the fulcrum; for in this kind of action as in that of the lever in rowing a boat with an oar, the power, the fulcrum, and the resisting force are all in motion.

The action we have described of a force applied to a straight lever resting against a support, is that of one arm of the funicular machine. When the two arms are joined, like a pair of compasses or a carpenter's rule, the mechanical advantages of the instrument are equally attained whether the moving force be applied in bringing the two arms into a right line after being bent, or in bending them at the joint when they are straight. In the former mode of application, the joint by which the two arms are connected serves as the fulcrum for each, in the same manner as the upright support formed the fulcrum for the single lever bar whose action we have just considered. The power is generally applied at the same point, though not necessarily so; and the resistance to be overcome laterally is at extreme ends of the two arms of the machine. As the power is thus exerted at hoth ends, the mechanical advantage is divided between the two, and acts with only half tho efficacy of the single bar.

We have thus endeavored to show that the machine, which has been inappropriately termed "funicular," may, like the pulley and the wheel and axle, be resolved into the lever. Its employment as a mechanical engine is always attended with a waste of power, because the moving force acts constantly transversely to the resistance. The peculiarity of its action, by completely altering the relations between the power and resistance at different parts of its motion, may in certain circumstances render its application advantageous; but the circumstances must be comparatively few when other mechanical powers cannot be more efficiently substituted.

ELECTRO-MAGNETIC ENGINES.

The possibility of applying electro-magnetism as a moving power is considered at great length in some recent numbers of the Brussels paper *L'Emancipation*. In these articles the subject of electro-magnetic action is taken up *ab initio*, and the writer, after describing the progress of discovery in the science, and the means adopted to procure rotary motion by varying the poles and the consequent magnetic attractions, proceeds to state the recent application of this force as a prime mover of machinery, by M. Jacobi, of St. Petersburgh. That philosopher, it is observed, after having effected a rotary motion by placing a permanent magnet on a pivot, so as to revolve between two electro magnets, the poles of which are changed as tho permanent magnet revolves, then made some alteration in the arrangement of the apparatus, which rendered its use in practice much more easy. One of these alterations consisted in using a conducting wire twisted round a cylinder, instead of a loose one. This arrangement had engaged the serious attention of many philosophers, and they ascertained the different effects produced by these helices, consisting of a greater or less number of turns of wire, compared with the wire employed in other cases.

"We shall not here undertake to discuss," continues the writer in *L'Emancipation*, "the relation that the entirely mechanical power of the Jacobi apparatus necessarily has with the chemical power of the pile. This question is merely theoretical, and would be quite out of place here. We shall confine ourselves then to the fact. We shall examine the consumption of the substances which the pile employed in this manner necessarily causes. Afterwards we will endeavor to render the mode of its operation more intelligible, by comparing the Jacobi apparatus with the steam-engine, so far as regards the consumption of elementary matter, and the connection which exists between power and velocity.

"A little explanation is first necessary, in order to point out the general principles on which the pile is constructed. This instrument in its most simple and elementary state is composed of a long vessel divided into a great number of compartments, by partitions formed of two metallic plates soldered together. The space between the partitions is filled with water mixed with sulphuric acid. Let us add that the two plates which form each division must be of different kinds of metal; thus copper and zinc are generally used. All these united plates are symmetrically arranged, and if the zinc surface of the first is turned to the left, and the copper surface to the right, the zinc surfaces of all the rest should turn to the left, and the copper surfaces to the right. Such, in effect, is the arrangement of the pile. Let us now say what takes place there when it is in action.

"The pile when in activity deteriorates, and is partially destroyed; it consumes the zinc and sulphuric acid. And, indeed, since all the effects of this instrument take place without the least consumption of the material being perceptible, this consumption must necessarily take place elsewhere; it is in the pile itself that the operation is going on. The chemical combinations which take place there will in all respects bear a comparison with the changes, the destruction, to use the general term, that is produced in the fuel in our steam-engines; only in the latter case, the change is effected by calorific, in the former, by electrical power.

"The expense of a steam-engine per horse power by the hour is estimated in proportion to the quantity of coal consumed in that time. The expense of an electro-magnetic engine is ascertained by the quantity of zinc that is oxidised. The sulphuric acid when uniting to the zinc in the divisions of the pile already oxidised produces a salt, a sulphate of zinc, as yet of not much use in commerce. The expense of the electro-magnetic machines will thus be estimated by the quantity of zinc converted into sulphate of zinc in an hour, for every horse power produced. This would be equivalent to the coal used by steam-engines.

"Each division formed by the two metals of the pile is called a couple. The number and size of the pairs of plates, that is, the number and size of each of them, are the elements on which the energy of the pile depends. There exists in every engine a relation between the power and the motion, which is of the greatest advantage. When it is required to increase the rapidity of the motion, the engine is unable to lift or to draw the same weight. If, on the contrary, the moving power is required to carry heavier weights, it is necessary to diminish its speed. But, independently of this relation between power and velocity, which in some measure admits of the extremes of each being obtained when requisite, there is another condition. Each engine is capable of its greatest efforts only when moving at a certain speed. It would be easy, as we have just observed, to diminish the rapidity of this motion, but the engine does not compensate in power for what it loses in velocity. There is one point the most favorable to the general work at which the engine acts with the greatest energy. These facts are equally applicable to electro-magnetic engines as to steam-engines, and to engines of every description.

"When a parallel is drawn between two electro-motive piles, and an estimate is made of the greatest quantity of work of which each is capable, it is ascertained that in voltaic piles, constructed on the same principle, the power of these machines increases according to the number of plates employed, and that in very rapid proportion. Thus by doubling the number of plates the power of the pile is quadrupled; by increasing the number ten times the power of the machine becomes nearly centuple.

"According to the experiments of M. Jacobi the power of the machine is not affected by the number of the turns of the wires wound round the cylinders, nor by the diameter and length of the latter; but they tend to regulate its speed, in the same manner as the governors in our common engines. The movement of the engine is accelerated or diminished by twisting a larger or smaller quantity of iron wire round the bars.

"Again, when in the construction of the pile platina and zinc are used, instead of copper and zinc plates, additional advantages are obtained. It is true that a pile constructed in this manner would be considerably more expensive, on account of the high price of the platina; but the power of the machine would be increased, and the working of the engine, in other terms its consumption, would be much less. Plates of platina and zinc would be two and a half times more effective than similar plates of copper and zinc. The expenses of keeping the pile in operation would be diminished nearly in the proportion of 23 to 14, or about a third.

"Thus in electro magnetic machines the number and extent of the plates represent the heating surfaces in our steam-engine boiler. The number of turns of the helices and the size of the bars are the proportions of the cylinder which regulate the motion of the piston; and again the different materials which may be used in the construction of the voltaic pile represent the coals or coke of various qualities employed in steam-engines. Here then are all the principal elements of steam-engines represented in the electro-magnetic engines. The extent of the heating surface, the length of the stroke of the piston, and the quality of the coal. The pile, indeed, has also its manometer, in the same manner as steam-engines have their manometers of mercury to indicate the density of the steam.

"In the first attempts of M. Jacobi, as well as in those of M. Lenz, who each constructed engines of this description at Petersburgh, the most striking anomalies were observed. A machine which they expected to be equal to ten horse power, was attended with a very different result. But since the laborious investigations of M. Jacobi have thrown additional light on the question; since that learned philosopher has founded and explained the mechanical theory of these machines, the construction of the apparatus is no longer liable to miscalculation. The manner of constructing them begins to be certain and methodical.

"Thus far has this question arrived; and we do not hesitate to say that it is important, and that it is deserving of serious examination. It is not because it comes from a distant country, or because it is brought out immediately under our own inspection, that we give preference to a discovery; but because we find it, after examination, to be well founded on theory and applicable in practice."

THE EXPANSIBILITY OF DIFFERENT KINDS OF STONE.

On the 20th of April, 1835, Mr. Alex. J. Adie, civil engineer, communicated a paper to the Royal Society of Edinburgh on this subject. It contained the results of an extensive series of experiments made upon different kinds of stone, as well as upon iron, and upon brick, porcelain, and other artificial substances. The instrument employed was a pyrometer of a simple construction, capable of determining quantities not greater than one thirty thousandth of an inch. The length of the substances generally employed was 23 inches. The general result of these experiments is, that the ordinary building materials of stone expand but very little differently from cast-iron, and that, consequently, the mixture of those materials in edifices is not injurious to their durability. The experiments from which the expansibility of the substances was numerically determined were made between the limits of ordinary atmospheric temperature and that of 212°, steam being introduced for that purpose between the double casing of the instrument.

The following results were obtained for the fractional expansion of the length, for a change of temperature of 180° Fahr.:—

TABLE OF EXPANSION OF STONE, &c.

	Decimal of length for 180° Fahr.
1. Roman Cement	·0014349
2. Sicilian White Marble	·00110411
3. Carrara Marble	·0006539
4. Sandstone from the Liver Rock of Craigleith Quarry........	·0011743
5. Cast-iron from a rod cut from a bar cast two inches square	·00114676
6. Cast-iron from a rod cast half an inch square	·001102166
7. Slate from Penrhyn Quarry, Wales	·0010376
8. Peterhead Red Granite	·0008968
9. Arbroath Pavement............	·0008985
10. Caithness Pavement............	·0008947
11. Greenstone from Ratho	·0008089
12. Aberdeen Gray Granite........	·00078943
13. Best Stock Brick..............	·0005502
14. Fire-brick....................	·0004928
15. Stalk of a Dutch tobacco pipe....	·0004573
16. Round rod of Wedgewood ware, eleven inches long..........	·00045294
17. Black Marble from Galway, Ireland.....................	·00044519

FOREIGN COMMERCIAL POLICY.

(*From the Times*, March 18.)

The report of the Commissioners for inquiring into the condition of the Handloom Weavers in the United Kingdom has just been laid before both Houses of Parliament. From the researches and statements of the assistant-commissioners who were authorised to visit the various classes of hand-weavers all over the kingdom, a vast body of information has been collected as to the dejected state and dreary prospects of a very large portion of the manufacturing population; whilst the commissioners in their own report have presented the country with a digest of this extensive evidence, accompanied by a statement of the evils they have had occasion to observe, and the remedies which they have thought it their duty to suggest.

The remedial portion of the report includes a discussion of so many of the most important questions which can affect society, that we lose no time in lending our assistance to diffuse the practical information which it contains.

Of these remedies many are stated to be the suggestions of the workmen themselves, or of well-meaning persons, eager to improve the condition of a suffering population without having materially weighed the cost or the consequences, the justice or the policy, of their measures. Others have been proposed by speculative politicians, and have not yet passed through all the slow but necessary stages of discussion and experiment. The restriction of competition by an increase of taxation on power-looms, or by other protective measures, belongs to the former class: the plans for reforming the combination laws, or for promoting emigration on a large scale, to the latter. But, amongst these remedies, those which are undoubtedly most secure, most ripe, and most urgent, are connected with the improvement of our commercial system, and the extension of our commercial relations with other countries.

It is no slight addition to the claims of a cause which has already so much justice and reason on its side, that they are backed by the most appalling statements of the present destitution and progressive decline of our manufacturing population. The sufferings of millions demand relief, even though that relief were not identical with the truest policy of England. But the welfare of the mass is identical with the interests of the country; and it is because the general privation and the general loss have not been fairly measured against the particular advantage of a protected interest, that the energies of the country are weighed down by an unequal and injudicious system of taxation. We argued the other day in favor of a reduction of the sugar duties on behalf of the West India planters; and we now confidently await that measure, with some others of equal importance, from the Government. But with how much more weight should we have spoken if we had dwelt on the sufferings of a people afflicted by the curse of scarcity; and if we had asked our rulers not only to benefit the planter, and to increase the revenue, but to feed the people by diminishing the duties on colonial produce—by adjusting the taxes on corn upon a system better calculated to avoid the evils of excessive fluctuation in price and entire prohibition, and by sweeping away the duties which exclude us from foreign markets without adding to our own revenue.

In the evidence given by Mr. J. Deacon Hume before the Import Duties Committee, we observed with regret a tendency to slight all attempts at negotiation for the improvement of commercial relations with foreign powers. Commercial treaties have often been ill made, sometimes suppressed by a minister, and sometimes annulled by events, but it is obvious that a treaty may accelerate that interchange of commodities between two countries, which might eventually spring up without it. On this point the Handloom Commissioners state, that—

"The urgency of the case, arising from the presence of an opportunity which may not soon recur, induces us to venture two more suggestions respecting our foreign commercial relations. The two greatest markets for our woven manufactures must in a very short time be subjected to a great alteration for good or for evil. The tariff of the United States of America is to be reconsidered in 1842. Our commercial treaty with Brazil expires in the same year. We will not hazard an opinion as to the nature or the extent of the concessions which may be necessary in order to enable us to retain our present intercourse with those countries, or which may be expedient for the purpose of increasing that intercourse. But we cannot refrain from expressing our earnest wish that measures may immediately be taken, supposing them not to be already in progress, to ascertain the state of feeling in the two countries to which we have referred, the points on which they are likely to require from us further facilities, and those in which they are ready to make concessions on their side, and, as respects Brazil, the capabilities of the country for an extended commerce.

"Our other suggestion respects Northern Germany. The plenipotentiaries of Hanover, Oldenburgh, and Brunswick have, we understand, agreed to renew the North-Western German Commercial League, a league founded on a tariff far more liberal in almost every respect than that of the Prussian League, and particularly so as respects British manufactures.

"The treaty, however, is not yet complete, and we are strongly of opinion that a favorable opportunity now exists for an arrangement between your Majesty's Government and the countries constituting the North-Western League, which would be beneficial in its immediate results, and still more so by the example which its benefits would in time hold out to the rest of Germany. A very few concessions on our part, and still fewer, if indeed any be required, on theirs, would produce an increase of commerce between the two countries, which would be useful to us, but of course much more so, from the proportion which it would bear to the rest of their commerce, to the countries constituting the North-Western League. To the influence of such an example we attach great importance. In every part of Germany in which the individual interests of local manufacturers do not prevail, not merely a belief in the superior advantages of free trade, but an earnest desire for it, is extending. This is particularly the case in the smaller states constituting the North-Western League, in the Hanse Towns, and the Grand Duchies of Mecklenburgh, and in the vast regions forming the Austrian empire. In general, it will be found that the benefits of commerce are best understood in the smaller states; because the less the state the greater is the proportion which its foreign commerce is likely to bear to its home trade, and also because in a small community the effect of every institution is more obvious. Russia, France, and England, all without doubt suffer from their restrictive systems, and all would be benefited by a change: but among the many causes which affect the prosperity of such vast and complicated bodies the effect of any single one is not easily ascertained or easily demonstrated. In the simply-constituted communities of the Hanse Towns, or the Duchies of Mecklenburgh, or even of Hanover, the influence of a single change becomes immediately perceptible. On the other hand, in the greater part of the Austrian empire there is as yet no manufacturing interest which can ask for protection at the public expense."

"'There is throughout Austria,' says Mr. Keyser, 'a great want of English manufactured goods. Could some arrangement be made with the English Government, such as to cause a reduction in the duties now paid in Austria, very large quantities of British goods could be there disposed of, particularly hosiery, which is comparatively dearer than any other article of wearing apparel. Thread hosiery is more generally worn than cotton.'

"If the result of a negotiation with the North-Western League were a freer intercourse between the two countries, and if the benefits derived by the people constituting that league were, as we have no doubt they would be, obvious and notorious, we are firmly convinced that there would arise throughout the vast and productive dominions of Austria a desire for an increased intercourse with this country, which the Austrian Government would not be able, and, we think, would not be desirous, to oppose. The important questions respecting the Stade tolls might be arranged at the same time."

In short, whatever be the legitimate influence of diplomacy on commerce, it is very evident that if we do not treat with other countries, other countries will treat without us; and that the extension of our trade will be impeded as long as such treaties last, since they are expressly calculated to give superior advantages to the intercourse of those other countries. It is not so much the opportunity for successful commercial negotiation that is wanting as the ability to improve it.

EXPORT AND IMPORT TRADE FOR 1840.

The state of our export and import trade for 1839 and 1840, and the amount of the public revenue for 1837, 1838, 1839, and 1840, have been published by order of the House of Commons. The exports of the principal articles of British and Irish produce and manufactures from the United King-

dom, in the years ending Jan. 5, 1840 and 1841, according to the declared value, were as follow:—

Exports of principal articles in 1839		£45,307,408
Ditto ditto	in 1840	43,924,958
	Decrease	£1,382,451

From the above exhibition it is shown that the exports diminished last year to the extent of nearly a million and a half sterling, although the labouring classes were relieved from the fearful privations they endured during the preceding year, through the high price of bread and other necessaries, and which caused the manufacturers to force their exports to an unnatural extent, even at a loss, in consequence of the greatly diminished demand for them at home. The decline in our woollen exports has been greater in proportion than in any other of our staple productions, being no less than £935,370, or about one-sixth of the whole yearly value. In 1839 they amounted to £6,271,645; in 1840 they declined to £5,336,275.

The customs duties on the imports of the two years were—

For 1840 (net)	£23,271,843
1839 (net)	23,081,680
Increase....	190,168

An increase is shown to have taken place during the last year in the amount of tonnage engaged in both the foreign and coasting trade. The navigation returns state that the vessels employed in the foreign trade of the United Kingdom, entered inwards, in 1840, were 22,725, tonnage 4,105,207; ditto, in 1839, 23,114, tonnage 3,957,468.

In the coasting trade the vessels employed amounted in 1840 to 10,766,056 tons; and in 1839 to 10,610,404 tons.

The official returns of the public income and expenditure during the last four years show a deficiency of revenue with an increasing expenditure. The additions made to the army and navy, the heavy expense incurred by the insurrection in Canada, the expedition to China, and the operations against Syria, have principally caused the increased charges upon the revenue; while its diminution has been occasioned by a variety of causes. The impediment caused by unsettled relations in our commercial intercourse with France and China, and the diminished consumption of articles of West India produce in consequence of their increased price, have acted injuriously upon our import duties.

The following general result is presented by the official tables of the public income and expenditure for the four years ending Jan. 5, 1841 :—

	£. 1837.	£. 1838.	£. 1839.	£. 1840.
Expenditure	47,130,954	47,678,687	49,357,691	49,161,536
Income	46,475,195	47,333,459	47,844,899	47,567,560
Deficiency	655,760	345,228	1,512,792	1,593,970

FLAX TRADE OF BELGIUM.

The cultivation of flax and its subsequent preparation is the staple employment of Belgian industry. One acre of every eighty-six in Belgium is devoted to its growth. The quality, notwithstanding the wonderful care bestowed upon the cultivation, depends upon the particular nature of the soil. Around Ghent no process of tillage could raise the finer description; the soil of the Walloon country yields the coarsest qualities; Courtrai that description fittest for strong thread; and Tournai alone furnishes the fine and delicate kinds which serve for the manufacture of lace and cambric.

Of the quantity of dressed flax prepared in Belgium, Great Britain takes off five parts out of eighteen. For some years past the exports have been gradually increasing. In 1835 they amounted to 4,610,649 kilogrammes; in 1836 to 6,891,991; in 1837 to 7,403,346; and in 1838 to 9,459,056. M. Briavionne estimates the annual wealth to Belgium, derived from this source, at 63,615,000 f.

"Belgium," says Mr. Tennent, "possesses no source of national wealth at all to be put into comparison with this, involving, as it does, the concentrated profits of the raw material and its manufacture, and at the present moment the attention of the Government and the energies of the nation are directed to its encouragement in every department, with an earnestness that well bespeaks their intimate sense of its importance." And he adds,

"Such is the superiority of Belgian flax, that whilst in some instances it has brought so high a price as £220 per ton, and generally ranges from £80 to £90, not more than £90 has, in any instance that I ever heard of, been obtained for British, and its ordinary average does not exceed £50."

A formidable party in Belgium is favorable to a restraint upon the export of flax, as its manufacture in Great Britain and elsewhere interferes with the foreign market for Belgian linen and thread. Thus it is at least possible that we may be deprived of the very important amount of raw material for our industry which we derive from Belgium. This possibility, and the very great desirableness of having within our own country all the means of profitable remuneration which can be offered to the industry of our people, ought certainly to lead the minds of agriculturists to the subject of the cultivation and after-preparation of the flax plant.

BRITISH PATENTS.

ENGLISH EXPIRED PATENTS.

Jonathan Lucas and Henry Ewbank, of Mincing-lane, London, merchants, for *an improved process to be used in the dressing of paddy or rough rice*, March 10.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(Continued from page 165.)

Robert Goodacre, of Ullesthorpe, Leicestershire, gent., for *an apparatus for raising heavy loads, in carts, &c., when it is required that the unloading should take place at any considerable elevation above the ground*, March 10.—The apparatus consists of four upright beams (forming the four corners of a square), which are secured and supported at their lower parts by other beams and stays, and each pair of beams is connected together by a long roller, which revolves in bearings in the tops of the beams. To each of the two rollers are attached two ropes, and the end of each rope is provided with a hook, on which hooks the article to be raised is suspended. On one end of each roller is a wheel or drum, round which an endless rope passes, and proceeds round a roller at the bottom of the apparatus, which is provided with cogs or teeth to enable it to take a firm hold of the rope. A rotary motion is given to this roller, and being communicated by means of the endless rope and drums to the two rollers, winds up the ropes suspended therefrom, and so raises the article attached to them.

Edward John Dent, of the Strand, Middlesex, chronometer maker, for *certain improvements in clocks and other time-keepers*, March 10.—Claim first.—The right of giving the impulse to the pendulum of a clock at the centre of percussion, or as near as practicable to that centre.

Claim second.—The right of producing a compensation for the expansion and contraction of the length of the pendulum, arising from changes of temperature, by causing the arcs of oscillation to vary in an inverse ratio to the variations of the length of the pendulum.

The pendulum is a solid iron cylinder suspended from the end of the pendulum rod, the length from the point of suspension being adjusted by a screw at the end of the pendulum-rod; and round the centre of the cylinder is a ring which carries two compensation pieces by means of clamps, the height of the ring being adjusted by lines drawn round the cylinder. The compensation pieces are each composed of two laminæ of brass and steel, the inner side being of brass and the outer side of steel.

The impulse from the escapement is communicated by two friction rollers to the compensation pieces, and by them to the cylinder. The friction rollers are supported by two rods, which each slide in an arm that extends horizontally from an arbor, and to each arbor another arm is affixed obliquely, which carries the palettes and detents, and also the two adjusting weights by which the force of the impulse to the pendulum is determined. The descent of the palettes in the teeth of the escapement wheel is adjusted by a screw in the end of the arm.

It is obvious that an increase of temperature lengthening the pendulum will at the same time throw out the compensation pieces, and cause them to strike the rollers with shorter arcs of oscillation, and consequently the tendency to slower oscillation, occasioned by the elongation of the pendulum, will be counteracted by the tendency to quicker oscillation from the reduction of the arcs.

Claim third.—The right of combining three or more main springs to act simultaneously, without the medium of a fusee, upon the train of wheels of a chronometer or other time-keeper.

Claim fourth.—The right of placing two intermediate wheels between the three or more barrel wheels and the centre pinion, in order to make a chronometer or other time-keeper go eight or more days at one winding-up.

Claim fifth.—The right of connecting three or more arbors of the main springs with a common arbor, whereby all the barrel arbors may be wound up at the same time by one application of the key.

There are four main spring barrels which have each a wheel on their arbors; they are divided into pairs, each pair driving a pinion (at nearly opposite sides), having an intermediate wheel on its arbor which drives the centre pinion.

On the winding-up arbor is affixed a wheel, which takes into four other wheels, one on the arbor of each main spring barrel, by which means the whole of the barrel arbors may be wound up at the same time.

Claim sixth.—The right of placing a chronometer or other time-keeper in an atmosphere of dry non-corrosive gas, contained in an air-tight case, through a stuffing-box, in which case the winding-up arbor passes, and in which it revolves, whereby all communication between the contained gas and the external air is prevented.

Claim seventh.—The application of the well-known voltaic or electro-metallurgic process to the deposition of a thin film of gold or other metal incorrodible by the atmosphere upon the steel balance spring and compensation balance, whereby rust is prevented, and consequently one cause of variation in the rate of chronometers is avoided.

Paul Hennuic, of Paris, but now of Clement's-lane, London, solicitor, for *improvements in the construction of governors or regulators, applicable to steam engines and to other engines used for obtaining motive power*, March 10.—Claim first.—The construction and arrangement of an inflated reservoir cylinder or receiver, supplied with atmospheric air, gas, water, or other liquid, by means of the moving power, the supply of which it is designed to regulate.

Claim second.—The combination of such inflated reservoir or other governor with a vane or damper in the furnace flue, by which the intensity of the fire is regulated according to the speed of the engine or the supply of steam; which damper may be variously constructed, and placed in the furnace flue or chimney, or in front of the furnace, according to the convenience or locality of the engine to be governed.

Claim third.—The peculiar construction of the moveable shuttle, or water-gate for hydraulic wheels, together with such modifications of the same as may be required in peculiar localities, by which the operation of this or other regulators is rendered available to hydraulic wheels.

The regulator is a frame containing a bellows or elastic reservoir, connected with two similar pieces of bellows underneath it. They are formed of leather, and are secured to horizontal plates or bases by iron straps. The middle plate which

separates the reservoir or upper bellows from the lower bellows is fixed, but the two other plates, viz., the top plate of the reservoir, and the plate that separates the two bellows, are moveable. A rod or central shaft rises from the top plate, and to it is fastened a chain, which, passing over a pulley, is attached to a sector provided with a counter weight. This sector is connected with the throttle-valve of the engine, so that any vibration of the sector opens or shuts the throttle valve, and governs the distribution of steam. A second chain or cord, attached to the central shaft, is carried over other pulleys, and transmits to a vertical shaft and register placed in the flue of the furnace a rotary motion, opening or shutting the flue of the furnace according to the elevation or depression of the reservoir, and thereby regulating the furnace in proportion to the amount of steam consumed.

To the base of the machine are firmly attached two supports, which receive the journals of a shaft provided with a double crank; and a fast and loose pulley, fastened on this shaft, carry a strap from any convenient part of the engine or first mover to be regulated. The cranks on the shaft are provided with connecting rods, which convey a reciprocating motion to two perpendicular rods guided in the ears of the fixed plate, and fixed by pins in the ears of the lower plate, *i.e.* the plate that separates the lower bellows; so that if any impulse be given to the horizontal or crank shaft, the connecting rods transmit a reciprocating movement to the perpendicular rods, which give an alternate up and down movement to the lower plate.

When the moveable plate is lifted up the air enters the bottom bellows through a valve, while by the same movement the air which was contained in the middle bellows will have been forced forward through a valve into the reservoir, and on the other hand when the lower plate descends the air which has been received into the interior of the bottom bellows will be forced forward through a leather pipe into the reservoir, whilst a fresh supply of air will be received into the middle bellows through an horizontal channel in the lower plate. By this means the air is alternately forced forward by each of the bellows to the reservoir.

Thus the principal function of the regulator is to accumulate in a common reservoir the air of two or more bellows, in order that the top plate lifted by the pressure of the air may communicate (according to the variation of the speed of the engine to be regulated) an ascending or descending motion to the central shaft, which communicates by means of chains, &c., with the throttle valve of the steam-engine, or the shuttle or water gate of the hydraulic wheel.

The escape of air from the reservoir is regulated by a valve suitably adjusted.

The form of the water-gate is either rectangular, curved, or cylindrical.

SAMUEL PARKER, of No. 170, Piccadilly, Middlesex, manufacturer, for *improvements in apparatus for preserving and purifying oils, and in apparatus for burning oil, tallow, and gas*, March 10.—Claim first. —The mode of constructing apparatus for preserving and purifying oil.

The patentee provides a vessel, which is divided by a partition into two compartments, upper and lower, the lower being by far the largest. From the upper a tube descends to nearly the bottom of the vessel, and above the vessel a funnel is placed, having a tube which descends to nearly the bottom of the vessel. The vessel has two cocks, one at the bottom and the other close under the partition.

In using this apparatus the cocks are first closed, then water is poured into the upper chamber until it rises to the top of its tube; then the upper cock is opened, and through the funnel the remainder of the space in the lower chamber is filled with oil. The upper cock is now closed, and the upper chamber is filled with water. The air which remains at the upper surface of the oil is next let off by the upper cock, which is again closed; and in this state things should remain for at least 12 hours before using the oil.

The apparatus should be kept in a warm place, and when emptied the vessel should be cleaned with hot water.

Claim second.—The mode of preserving the wicks from charring.

The gallery that supports the chimney is fixed above the tube that receives the wick, but below the upper part of the wick; by this means the air to support combustion at the outer surface of the wick is caused to flow against the wick, and thus preserve it for a much longer time from being charred.

The following is another mode:—A disc of metal having an opening through it for the passage of the flame, is supported by a hoop of wire in the chimney above the tube that contains the wick, and below the top of the wick.

The patentee likewise shows another mode of accomplishing the same object.

Claim third.—The mode of constructing the chimney, and the means of applying it for regulating the extent of flame.

The lower end of the glass chimney is bell-mouthed, and formed in such a manner as to cause the air to be conducted against the wick before it rises above it. The chimney has a metal top, which being slit at the lower ends, and bent slightly outwards, can be slid up and down the glass chimney; by which means it will be found that the extent of the flame can be regulated; but the metal top may be dispensed with, and the regulation of the extent of the flame effected by the rising and falling of the chimney.

For this purpose, the chimney can be raised and lowered in the following manner:—The gallery consists of two rings, which are joined together by short radial bars. The inner ring is affixed to the external tube of the burner by short radial bars, and there is an inclined slit in the external tube, through which a projecting pin from the tube containing the wick passes. Hence, when the gallery is turned, it will rise or fall on the pin in the inclined slit; and by such means the height of the chimney will be regulated, and the extent of the flame will also be governed.

Claim fourth.—The mode of arranging the parts of the gallery and the upper part of the lamp, that by bringing them together the lamp will be put out.

The patentee so constructs the under surface of the gallery and the upper surface of the lamp, that by having these surfaces ground to fit closely and as air-tight as possible, he can by the simple act of turning down the gallery so as to bring the surfaces together, put out the lamp without occasioning any disagreeable smell.

Claim fifth.—The mode of constructing fountain lamps, by conveying the overflowing oil into the lowest chamber but one, at the same time preventing access of air to the flame in that direction.

The fountain lamp is for the most part similar to that for which a patent was obtained some years ago by the present patentee, the only novelty in this one being the causing of the overflow oil from the burner to flow into the bottom chamber but one, (the lamp consisting of four chambers), in place of allowing it to descend into the second and lowest chambers as heretofore.

The access of air to the flame from the overflow chamber, is prevented by the mouth of the tube through which the overflow oil descends being immersed in oil.

Claim sixth.—The mode of constructing lamps by causing the air to be conducted against the wick.

This is a chamber lamp, and the air is admitted all round the wick by a peculiarly constructed tube from the bottom of the lamp. The chimney is so constructed as to turn the air against the wick in the manner above described.

MARK FREEMAN, of Sutton Common, Surrey, gent., for *improvements in weighing machines*, March 10.—Claim.—The mode of constructing weighing machines as herein described.

The first part of this invention relates to the mode by which the beam of this machine is made to take a new bearing or point of suspension at each additional weight. The machine is composed of a pillar, upon the top of which are two curved plates of steel, and near the bottom of the pillar is an inverted curved plate, having a scale of weights on the face of it. The balance part of the apparatus is a long rod, having a round weight formed on one end, and a hook for holding letters, &c., suspended from the other. Along this rod, near its centre, are fastened as many bars, having at each of their ends a knife edge, as there are different degrees of weight marked on the scale. These knife edges are guided into the proper positions on the tops of the curved steel plates by two side plates attached to the two steel plates, having notches in them to receive the knife edges. The knife-edges resting on the steel plates as they come into action form their fulcrum for the time being.

The beam will therefore be seen to have several fulcra, which come into action according as the letter or other article to be weighed is more or less heavy.

The weight of the article is shown on the scale by means of a rod and pointer, suspended from the centre of the balance rod. The second part of this invention relates to suspending scales for a scale-beam in such a manner that the leverage of the end of the beam from which the scale is suspended, that receives the matter to be weighed, shall be considerably greater than the leverage of the other end of the beam from which the scale that receives the weights is suspended; by which means the matter weighed will only be a known proportion of the weights used when the scale-beam is brought to a state of equilibrium, in place of the matter weighed being equal to the weight employed as heretofore. By this means weighing for analytical and other purposes may be carried to a greater extent without having weights so small as those now in use for that purpose, but by using such small weights as are at present employed the weighing of the most minute particles of matter may be performed. Thus supposing the leverage of that end of the beam from which the weighing scale is suspended to the leverage of the other end of the beam to be as 5, 10, 20, or 30 to 1, the same weights now employed would enable the operator to weigh matters of a 5th, 10th, 20th, or 30th the weight that he is now enabled to weigh, and with the same facility in respect to the weights that he is now enabled to do when weighing matters only equal to the weights employed.

The scale-beam is suspended on a pair of knife-edges; that portion of the beam to which the weighing scale is suspended being ten times longer than the other part.

CHARLES DELBRUCK, of Oxford-street, Middlesex, gent., for *improvements in apparatus for applying combustible gas to the purposes of heat* (communicated by a foreigner), March 10.—Claim first.—The mode of constructing an apparatus for joining metals by combining the air and gas tubes, or pipes thereof, one with the other, so as to bring the gas and air together at the point of combustion, when the air passes through the tube as described.

This apparatus consists of a tube having a handle attached at one end, and at the other a copper bit for joining metals; through the external tube the gas passes; and within it is another tube for air, which terminates within the external tube a short distance from its outer end, the outer ends of both tubes being open. In order to heat the copper bit, the gas is lighted, and the air passing, it greatly increases the intensity of the heat.

Claim second.—The mode of constructing apparatus for consuming gas, when applying it for the purposes of producing heat, by causing a series of jets of air to be propelled amongst or near a flame of gas.

This apparatus consists of a chamber, through which a pipe, perforated with holes, passes; gas is first introduced into the chamber, and lighted, when it will burn with a "soft flame," but on air being admitted through holes in the pipe, it will cause it to burn in jets of flame, and the heat will be much increased.

Claim third.—The mode of introducing jets of air into a tube, through which inflammable gas is passing.

The air is admitted into the flame of gas in a similar manner to that above described.

The patentee prefers using carburetted hydrogen gas where cheapness is considered, and pure hydrogen where great intensity of heat is required.

Hugh Lee Pattinson, of Bensham-grove, near Gateshead, Durham, manufacturing chemist, for *improvements in the manufacture of white lead*, March 10.—Claim.—The mode of manufacturing white lead, by means of carbonate of lime, and the chloride or nitrate of lead, as herein described.

This invention consists in the application of carbonate of lime to certain salts of lead, in such a manner as to produce decomposition of the salts of lead, and a reciprocal exchange of acids and bases, between the carbonate of lime and the salt of lead employed. By the chemical re-action carbonate of lead (white lead) is obtained, and a solution of a salt of lime, the composition of which depends on the particular salt of lead made use of in the process.

The patentee employs a mill called a "flint mill," which is well known and in constant use at potteries. Into a mill of this kind, 12 feet in diameter, and three feet deep, is put 21 cwt. of chloride of lead, and 7½ cwt. of carbonate of lime; a convenient form of which is, that of the best washed chalk or whiting; the tub is then filled with water to within 15 inches of its edge. The mill is then set in motion, and the materials are ground together during from four to six hours; after which the grinding is discontinued, and water is added till the tub is nearly full. The whole is then allowed to stand till the next morning, when a white mass will be found at the bottom of the tub, which consists of carbonate of lead mixed with undecomposed chloride of lead and carbonate of lime; and above it a clear liquor, which is a strong solution of chloride of calcium, nearly free from lead. This clear liquor is drawn off by a syphon, and the tub is nearly filled with water; the grinding is then continued for a few hours, after which it is suffered to stand till the next morning. This process is carried on in the same manner day after day, the chloride of calcium in the liquor gradually getting weaker, until at the expiration of from seven to fourteen days it is nearly tasteless; the process is then complete.

The white mass at the bottom of the tub is carbonate of lead, which is removed from the tub and dried, and prepared for the market in the usual manner.

When making white lead with water saturated with carbonic acid gas, the patentee operates in the following manner:

A barrel is provided, either of lead, copper, or wood, four feet in length by two feet and a half in diameter, well hooped with iron, and bound at both ends, to resist the necessary pressure; the barrel is suspended on gudgeons, on one of which is a "live and dead pulley," to which a strap is carried from any suitable machinery, so that the barrel may be made to revolve at pleasure. There is a hole through the other gudgeon into the barrel, and just beyond the bearing part of the gudgeon is a stop-cock. This gudgeon is connected by a screw-joint with a forcing pump for forcing carbonic acid gas into the barrel.

The patentee introduces through an opening in the side of the barrel 140 lbs. of chloride of lead, and 50 lbs. of carbonate of lime, and nearly fills the barrel with water; the opening in the side of the barrel is then closed, and by means of the forcing pump the water is saturated with carbonic acid gas, under a pressure of from five to six atmospheres, and the barrel is then caused to revolve.

The substances begin immediately to re-act on each other, the carbonic acid solution dissolving the carbonate of lime, and presenting it to the chloride of lead in a form to be immediately decomposed.

At the end of four days, the decomposition being nearly complete, the substances in the barrel are allowed to settle. The solution of chloride of calcium is then drawn off, and the barrel again nearly filled with water, saturated with carbonic acid gas. At the end of another day or two the process is complete. The lead is then taken out of the barrel, and prepared in the usual manner.

When using nitrate of lead, instead of chloride of lead, the proportions are as follow:—when operating with water only, 24 9-10 cwts. of nitrate of lead, to 7½ cwts. of carbonate of lime. When using water saturated with carbonic acid gas, 166 lbs. of nitrate of lead to 50 lbs. of carbonate of lime.

Henry Houldsworth, of Manchester, cotton-spinner, for *an improvement in carriages used for the conveyance of passengers on railways, and an improved seat, applicable to such carriages and to other purposes*, March 10.—The patentee claims: First.—The use and application, for the purposes herein specified, of wire gauze, hair cloth, perforated metal plates, and other interstitial or perforated fabrics or materials, to carriages used on railways, whether the material be applied in the precise manner herein set forth, or not.

Secondly.—The application and use of springs or weights to turn or fold up seats when not in use.

Thirdly.—The retaining apparatus, and the retarding apparatus, applicable to such seats.

Fourthly.—The application of springs or weights in combination with the retaining and retarding apparatus, or either of them, and all modifications of the same.

In place of glass windows for railway carriages, the patentee uses sheets of wire gauze, secured by small nails; by which means the drafts arising from rapid travelling are obviated, and the gauze effectually prevents the entrance of coke-dust into the carriages.

The seat is hinged to the inner pannel of the carriage, and to the pannel below the seat one end of a prop is fastened, the other (upper) end sliding in a shallow groove, in the underside of the seat. Between the inner and outer pannels is a flat whip spring, which is connected by a link to the centre of the prop. This spring is perpendicular when in its quiescent state, as are also the prop and seat; but on the seat being pressed down into a horizontal position, the prop travels along the groove until its head abuts against the end of the groove, at the same time, by means of the link, dragging the spring into a curved form. On the weight being removed from the seat by the person rising, the spring by its re-action draws back the prop and raises the seat.

The patentee also shows another arrangement of springs for folding up the seat, with a retaining apparatus.

The retarding apparatus consists of the following:—Between the inner and outer pannels is placed a cylinder filled with air or other fluid, which cylinder is hinged at the bottom to the framing. The piston of the cylinder has a valve opening downwards, and the piston rod is attached to a bar extending from the back of the seat; so that on the seat being lowered, it raises the piston, and the air descends through the valve; but when the spring raises the seat, the valve closes, and the piston descends, but very slowly, owing to the resistance of the air beneath it, which has no means of escape except at the sides of the cylinder.

James Pilbrow, Esq., of Tottenham, Middlesex, for *certain improvements in steam-engines*, March 10.—The patentee claims the "condensing cylinder engine," to save the steam which during the stroke is now lost by an imperfect exhaustion of the cylinder; and to obtain a better vacuum, by which the expansion of steam can be carried out to a greater extent than in the present engines. Also the substitution for the separate condenser and distinct air pump of the present engines, of a condensing cylinder, combining both in one, to condense therein by injection, (the plan of regulating which by the engine, according to its speed, the patentee also claims,) such condensing cylinder being fitted with a solid piston, acting as a double action air pump for the purposes herein described. Also the alternative of condensing by surface, by two or more cylinders and solid pistons surrounded by water in tanks to be supplied by force-pumps, but the patentee thinks condensation by injection more simple and more rapid. Also the arrangement of the condensing cylinder engine, to pass the "dead parts" with one engine. And lastly, the particular method of supplying and regulating water to high or low pressure steam boilers without a force pump, and without taking such power from the engine.

The patentee removes the condenser and air pump, and substitutes for them a cylinder of the same size as the steam cylinder, provided with a solid piston; the top and bottom of the condensing cylinder are provided with a perforated nozzle for the injection water, by which the steam is condensed; the cylinders communicate with each other by suitable valves, moved by the machinery, and the machinery is so arranged that when the piston of the condensing cylinder is at the top, the piston of the steam cylinder is at the bottom, and *vice versa.*

The operation is as follows:—Supposing the piston of the condensing cylinder to be at the top of its cylinder, and the piston of the steam or working cylinder to be at the bottom of its cylinder, having just made its downward stroke, then steam being admitted beneath the working piston will cause the same to make its upward stroke; at the same time, the upper valves communicating between the two cylinders being opened, the waste steam above the working piston rushes into the condensing cylinder above its piston, which is now making its downward stroke. While this is going on, the waste steam is being condensed by water injected through the upper perforated nozzle, and the whole of that steam is condensed by the time the working piston has finished its upward stroke. Steam is now admitted above the working piston to effect the downward stroke, and at the same time the lower valves communicating between the cylinders are opened for the admission of the waste steam below the piston into the condensing cylinders. The piston in the condensing cylinder at the same time commencing its upward stroke. The waste steam as it enters the condensing cylinder is again condensed by water, injected through the perforated nozzle; so that by the time the working piston has finished its downward stroke, the whole of the waste steam will have been condensed.

The up and down stroke of the piston of the condensing cylinder is effected by connecting rods fixed to the other end of the beam.

The patentee also condenses by using two or more cylinders surrounded by tanks of water, exposing a large surface of cylinder to the steam to be condensed, instead of condensing by injection.

In the arrangement of the condensing cylinder engine to pass the "dead parts" with one engine, the patentee attaches the piston-rods of the working and condensing cylinders to two cranks on the same shaft; and the cranks are so arranged that while the working piston is at the bottom of its cylinder, the piston of the condensing cylinder is at mid-stroke.

The supply of water to a steam-boiler is regulated by the following means:—A strong metal bracket is fastened to the side or end of the boiler, its upper surface being on a level with the high water line of the same, and in its upper surface near the side of the boiler is the end of the supply-pipe from the hot water cistern. Over this is placed a hollow box, with its open part downwards, and its edges are made as smooth as possible, so as to slide steam-tight on the bracket. The action of it is as follows:—the box being over the pipe is filled with water, and is then slid along the bracket, till its hollow part projects over the ledge of the same; by which means the water is emptied out of the box, and its place filled by steam. The box is then slid back over the supply pipe, the steam within it condensed, and the box again filled with water. But when the water rises above the bracket, the box returns filled with water over the end of the pipe, so that the water can never rise above the high water-line of the boiler.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page* 165.)

GEORGE ALEXANDER GILBERT, late of Southampton-buildings, Middlesex, but now of Norfolk-house, Battersea, Surrey, gent., for *certain improvements in machinery or apparatus for obtaining and applying motive power*, March 10.—Claim.—The mode or method of producing motive power, by the use of steam, gas, or any other fluid, conjointly or separately, as herein described.

This invention consists in certain novel features in the construction of engines, to be moved by steam, air, gas, or other elastic fluid, whereby the cylinder hitherto employed is dispensed with, and in its place certain tubes are substituted, which slide one within the other, in the same manner as the tubes of a telescope.

That part of the engine which is intended as a substitute for the ordinary cylinder consists of two tubes; one end of each of which is bolted to a steam-box or chamber, which is divided in the middle into two compartments. These tubes slide on stationary tubes affixed to the frame-work, and there are stuffing-boxes formed on or attached to the ends of them, to keep the joints steam-tight. There are two cocks at the under part of the steam-chamber, which are for the purpose of allowing the steam, &c. contained therein to escape, previous to setting the engine to work. The steam is admitted into the tubes and allowed to escape therefrom by valves of the ordinary construction. The steam-chamber and sliding tubes are mounted on pulleys or anti-friction rollers, which run in grooves formed in the frame-work.

The following is the operation of the machine:—The steam, on being admitted at one end of the machine, rushes through the tubes into the steam-chamber; there exerting its elastic force against the partition of the chamber, it forces it forward to the allotted distance. The exit valve, at that end at which it entered, is now opened, and the steam being admitted at the other end of the machine acts upon the steam chamber in a reverse direction, and forces the waste steam out of the tubes.

The reciprocating movement of the chamber and tubes is converted into a rotary movement in the following manner:—Connecting rods are attached to the steam chamber by means of pivots, and the reverse ends of these rods are connected to the crank of the main shaft, which is mounted in plummer boxes. From the shaft the moving power is communicated by a pulley and band, governed by a fly-wheel for the purpose of driving other machinery.

CHARLES DOD, of No. 12, Buckingham-street, Adelphi, Middlesex, gent., for *certain methods or processes for the manufacture of plate-glass, and also of substances in imitation of marbles, stones, agates, and other minerals, of all forms and dimensions, applicable to objects both of use and ornament*, March 12.—Claim.—The methods and processes herein described for the several purposes to which they are severally and respectively applicable.

Glass of any size is placed in moulds made of fire clay, the interior surfaces of which are done over half with plaster of Paris and half with talc, which gives a very smooth surface; and the pieces of glass are arranged according to the disposition of the design it is wished to form, if any. These moulds are then placed in a muffle furnace, or oven, and the heat of it is gradually brought to the temperature requisite for a commencement of fusion, which is increased to a degree sufficient to solder together all the pieces of glass enclosed in the mould, so that they become one and the same piece. Above or over the moulds are placed funnels, made also of fire clay, into which glass is poured in a somewhat more fusible state, and which, in melting, fills the cavities that remain between the pieces of glass contained in the mould. The furnaces are permitted to grow gradually cool, after being hermetically closed, and they are opened only after a lapse of some time, calculated according to the size of the pieces contained; the object being to prevent any risk of breakage.

The furnaces are constructed upon the same principle as those used by bakers, with the sole difference, that these are heated by putting the fire beneath in place of within the furnace.

To employ these methods or processes, for the formation of blocks in imitation of marbles or precious stones, &c., the patentee operates in the following manner:—The glass after being made in an ordinary glass-house furnace, containing metallic oxides, is placed in the moulds as hereinbefore explained, and is made to undergo the oxidation appropriate to it. It then presents the colors desired, which are more or less opaque at will.

All objects thus manufactured should be polished as looking-glasses are, which gives them the most beautiful effect.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 22nd of May.

Thomas Lawes, of Canal Bridge, Old Kent Road, feather-factor, due May 10.

William Mac Kiniey, of Manchester, engraver, due May 10.

Charles Edward Arnos, of Great Guilford-street, Borough, millwright and engineer, due May 10.

Eugenius Birch, of Cannon Row, Westminster, civil engineer, due May 12.

John Heaton, of Preston, overlooker, due May 12.

Otto C. Von Almonde, of Threadneedle-street, merchant, due May 12.

John Annes, of Plymouth, printer, due May 14.

FOREIGN INTELLIGENCE.

FRANCE.

THE ARTESIAN WELL IN PARIS.

The Municipal Council of Paris on Friday definitively voted a sum of money to indemnify M. Mulot for all losses he may have sustained in the performance of his contract for boring the well at Grenelle. Besides this, it has voted M. Mulot a life annuity of 3,000f. for his skill and perseverance in executing this great work, with a reversion of 1,500f. per annum to his wife for life. It has also granted a sum of 5,000f. to his son, who has assisted him throughout the operations. It has also granted 100f. to each of the men employed in the works; 1,000f. to one who two years ago lost a leg by an accident during the operations; and 3,000f. for the publication of the whole of the proceedings of the boring, from the 28th December, 1833, to the 26th February, 1841. The editing of this record is intrusted to M. Arago. The water of this well, upon analysis, is found to contain only half an ounce of calcareous matter in twenty-six gallons, while the water taken from the Seine above Paris contains, in the same quantity, five-eighths of an ounce, and that of the canal de l'Ourcq seven-eighths of an ounce of calcareous matter.

The Society of Sciences, Agriculture, and the Arts, of the Bas Rhin, have offered a prize of a golden medal to the inventor of an agricultural implement, the utility of which, for the agriculture of that department, shall have been duly proved.

BELGIUM.

ROYAL ACADEMY OF SCIENCES AND BELLES LETTRES.

At a recent sitting of the Brussels Royal Academy the secretary presented an instrument intended to execute perspective designs, which is called by the inventor *coordonnateur perspectif*. The eye being placed at a fixed point observes the different places the relative positions of which are required, by means of a second moveable point of two crossed wires. The small frame which holds these two wires slide along a graduated rule, which also moves perpendicularly to a second graduated rule. By this means the two rectangular coordinates of every point that is required to be in perspective may be measured.

In one of its preceding sittings the Academy commissioned three of its members to examine printing papers. This question having given rise to observations which appeared to be of general interest, the Academy has resolved to publish the reports of the commissioners. In the first of these reports M. Martens mentions the result of his researches, and the experiments he has made to prove the effect of the bleaching of paper by chlorine, and he has arrived at the conclusion, that, if properly used, this means of removing discoloration is not injurious to the fabric of the paper.

M. Quetelet stated, from the results of experiments made at Brussels, it appears that during 1840, as during 1839, the temperature in that town has been higher than at Louvaine and Ghent. As to barometrical observations, M. Quetelet stated, that Messrs. Ravais and Martens, on returning from an expedition to the north, compared their observations with those at the observatory at Brussels, and communicated at the same time the result of similar comparisons which they had made at Stockholm, Copenhagen, Altona, Berlin, Dresden, Gottingen, &c.

An anonymous correspondent has written to the Academy requesting the following question to be submitted among the ensuing list of prizes, to which he would furnish an answer. To give a description of the shells and fossil polypæ of the slate and coal formations of Belgium, and to indicate exactly the places and the class of rocks in which they are found.

The sale of Mr. Cockerill's establishment, comprising two lots, the first Seraing and its dependencies, the second the house at Liege and those of Spa and Tilleur, could not be effected on the 10th inst., as had been announced, no buyers having appeared.

Mr. Whiteford Mackenzie, of Edinburgh, has presented to the Royal Library of Brussels the first volume of the collections of the Abbotsford Club. Only a small number of this work, which is not sold, has been printed.

The *Journal des Flandres* says, that after the *soirée*, given by the minister to the savans of the country, it was agreed by the literary men of Liege and Ghent, that periodical re-unions should take place in those towns very frequently.

A public exhibition of the products of Belgian industry has been ordered by the King to take place in July 1841. The decree by which this exhibition was ordained stipulates various conditions to which the exhibitors are to submit, and specifies the kind of articles to be exhibited. It is a necessary condition that all the articles exhibited should have been manufactured or produced in the Belgian territory; and the prohibited articles comprise drinks of any kind, eatables, chemical compositions that may take fire spontaneously, articles badly manufactured, and those that are useless and cannot become articles of trade, or of art, or of ornament. It is ordered by the eighth article of the decree, that the governors of the provinces shall transmit their own opinions, and those of the local commissioners, respecting the importance of the manufactures, or of the establishments of the exhibitors; and that they shall also point out to the Minister of the Interior the manufacturers who are distinguished by the good arrangements of their establishments; those who by the formation of benefit societies, or other means, secure to their workmen certain advantages in case of illness, accident, or infirmities; and also those who contribute to benevolent institutions, such as hospitals, charity schools, &c.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

Stafford and Rugby Railway Bill.—In the House of Commons, on Wednesday, the second reading of this bill was strongly opposed, and after an animated discussion, it was negatived on a division by 154 against 94. The two leading members of the Opposition, Sir Robert Peel and Lord Stanley, took directly contrary views on the question. The former argued that the proposed railway would effect a saving of nine miles and a half, with better gradients, on the distance between London and Liverpool. He contended that the House of Commons were bound to encourage competition, and not to allow the great monopolists of the London and Birmingham railway company to interpose, for the purpose of quashing a rival undertaking. Lord Stanley, on the other hand, maintained that the saving of time would only be ten minutes between London and Liverpool, which was not sufficient to warrant an expense of £1,300,000. He observed, too, that there would be no advantage of competition established, as the line of railway proposed was only a branch of, and a divergence from, the great line. These arguments prevailed, and the bill was thrown out.

North Midland Railway.—It is a remarkable fact that the subsidence of the embankments on this line, and the influence of the severe weather, have been less than any other line of equal age. This is owing to the excellence of the materials, and will, no doubt, be the means of keeping that heavy item of expenditure, the maintenance of way, unusually low upon the North Midland Railway. *Sheffield Iris.*

Great North of England Railway.—The tenth half-yearly meeting of this railway company was held at the company's offices at Darlington last week. Mr. Storey having resigned his situation as engineer in chief, the board of directors agreed to secure the professional advice of Mr. Robert Stephenson, to report to them on the state and progress of the company's works. The report of the directors states that the total receipts and payments, up to the 31st of December last, were:—Receipts.—On calls, payments in advance, &c., £471,274 5s. 10d.; on debenture bonds, £327,433 12s. 3d.; notes discounted by the treasurer, £25,000:—Total, £823,707 18s. 1d. Payments.—Parliamentary, engineers, law charges, arbitrations, printing, direction, salaries, land and compensation, &c., &c., £252,656 14s. 9d.; contract for works and materials, £512,733 13s. 8d.; interest on loans, engines, and passenger carriages, £49,140 4s. 2d.; balance in treasurer's hands, 31st December, 1840, £9,177 5s. 6d.:—Total, £823,707 18s. 1d.—Mr. Stephenson's report gave a detail of the whole line of railway, commencing at York, and proceeding on to Darlington, with the state and progress of the different stations in the line, and approved generally, with some trifling exceptions, of the design and construction of the railway by his predecessor. It was agreed to take, upon loan, the sum of £50,000, in order to enable the directors to finish the works. It was stated that it is intended to proceed with the line northward to Newcastle with as little delay as possible.

Cornwall and Devon Railway.—The committee met at Truro last week, the Earl of Falmouth in the chair, when Capt. Moorsom laid before them the plans and sections of the entire line between Falmouth and Exeter. The distance from Falmouth to Exeter by statute miles is 99, and the proposed line, extending to Cowley-bridge, two miles or more north of Exeter, will be 104. In May or June another county meeting will be convened to receive the committee's report, and to decide on ulterior proceedings.

Edinburgh and Glasgow Railway.—The span of the viaduct on the Edinburgh and Glasgow Railway, that crosses the Union Canal at Tamfourhill, near Falkirk, had the keystone put into it on Thursday, the 4th inst. This is supposed to be the largest stone arch in Great Britain of so low an elevation; the length of the span is one hundred and thirty feet, the height from the springers, twenty-four feet six inches, the height from the ground underneath, thirty-five feet. The stones of which this great arch is composed, were all brought from Forfarshire; they are five feet deep in the bed, of a bluish color, and peculiar strength. The weight of the arch stones alone of this stupendous piece of masonry, is upwards of nineteen hundred tons. The arch was thrown upon trussed centres, constructed by Mr. Mitchell, who manages the building department in the contract. It required no less than between twelve and thirteen thousand cubic feet of timber for their construction. The contractors, Messrs. Forbes, Ross, and Mitchell, have, with the aid of their machinery, performed this operation in the shortest period of time imaginable for such a mighty fabric. The arch work was commenced and finished within the period of twelve days only. Mr. Glennie, the resident engineer, superintended the whole, and it is to be hoped he has done himself no small credit, as it was at one time thought to be an impossibility to throw an arch over such a width of span, with so low an elevation. Immediately after the keystone was put into its place, which was in the evening, the people employed thereat gave three tremendous cheers, which echoed throughout the magnificent vault, to the great satisfaction of all present. They then paraded, in masonic order, to Falkirk, accompanied by an instrumental band of music, where they received a repast from their employers. The best view of this splendid structure is from the south, where the five arches adjoining to the west of the large arch may be seen to great advantage. On the top of the viaduct where the railway carriages are meant to pass, the passengers will see, on looking to the north, east, and west, one of the most magnificent and extensive views that almost any country can boast of; the beholder can see from the top of the viaduct a considerable portion of seven different counties. At the extremity of the view on the north and west is to be seen the top of the majestic Grampian mountains, towering into the skies, with the beautiful chain of Ochill hills ranged in front. On the east and north, this grand natural panorama is enlivened by the Frith of Forth winding up for many miles into a country teeming in rich fertility, and varied by all the softer beauties of nature. In the foreground is the town of Falkirk. This completes a scene, the beauty and extent of which can only be appreciated when actually seen.—*Stirling Observer.*

Glasgow and Greenock Railway.—A special general meeting of proprietors of the Glasgow, Paisley, and Greenock Railway Company was held last week at Greenock, to consider the bill now before Parliament, for increasing the capital of the company. The new bill was unanimously approved. In answer to a query regarding the opening of the line, the engineer, Mr. Errington, stated that he could, with the utmost confidence, assure the proprietors that the line should be opened to the public during the present month; on what day he was not quite prepared to say. The announcement gave great satisfaction, and the meeting separated.

Railway Traffic, &c.—We extract from the return just laid on the table of the House of Commons, in accordance with the motion of Lord Granville Somerset, the following statements relative to the gross receipts from passengers on the following railways during the second half year of 1840:—viz., Ulster Railway, gross receipt from passengers, £4,972; Arbroath and Forfar, £2,118; Newcastle and Carlisle, £17,555; Glasgow, Paisley, Kilmarnock, and Ayr, £18,892; Manchester and Birmingham, £8,506; Northern and Eastern (for $2\frac{1}{2}$ months only,) £5,457; Manchester and Leeds, £24,891; Grand Junction, £158,571; Liverpool and Manchester, £70,432; London and Croydon, £16,741; Dublin and Kinstown, £20,955; London and Birmingham, £289,195; Brandling Junction, £12,952; London and South Western, £115,016 North Union, £26,247; Manchester and Bolton £9,910; Lancaster and Preston, £10,716; Great Western Railway, £126,303; (this, however, includes the charges for horses and carriages, which the company have mixed up with the passenger traffic, although a separate return is made by them for cattle, pigs, sheep, and goods); Eastern Counties £12,856; Midland Counties Railway, £33,214. The above returns are made by the secretaries of the several railway companies, in compliance with the provisions of the act 3 and 4 Victoria, c. 97. The amounts stated only include the sums received from passengers by the railways; the amount received for horses, sheep, pigs, cattle, carriages, and goods, &c., of every description, forms a considerably large item in the receipts of several of the above-mentioned companies.

Alleged Wilful Obstruction on a Railway.—At York Assizes on Tuesday, a person named Holroyd was indicted for wilfully placing obstructions upon the railroad leading from Leeds to Manchester. It appeared that there were disputes about the division of a highway on part of the line of railroad, and the defendant having claimed title to a part of the land over which a small portion of the railway ran, was desirous of asserting his right, and it was alleged, on the part of the prosecution, that he had placed some barrows and soil from a ditch on the road, so that, if a train had come upon it, mischief would most probably have ensued. Notice was fortunately given to the approaching train in time, and no damage occurred beyond the delay occasioned by the obstruction. On the part of the defendant, it was contended that the obstruction was the effect of accident, and not of design. In summing up the case to the jury, Mr. Justice Maule told them, that by an act of Parliament parties were very properly prevented from asserting their rights, however just, in the manner represented by the prosecution, because to obstruct a railway would endanger the lives of many persons. The courts were open, and, if wrong was done, the party must seek redress there. On the other hand, any obstruction must be occasioned wilfully to subject the party to punishment. The jury retired, and having been absent about four hours, returned into court to request that his Lordship would explain to them more fully the meaning of the word "wilfully." His Lordship said, in the present case it was opposed to what was accidental; that was wilful which was designed, and might have been prevented; that was accidental which the party did not intend, and which he was unable to prevent. Thus, if a man attempted to carry a beam of wood across a railroad, and really intended so to do, and it proved too heavy, so that he was unable to accomplish his intention, and it fell from his shoulder upon the road, it would be accidental; but if he took up a piece of timber, and threw it purposely on, it would be wilful, though he did it to assert a right, and without any design to injure anybody. The jury again retired, and having been absent between two and three hours longer, it was suggested by the counsel for the prosecution that they might be discharged from giving a verdict. This was readily acceded to on the other side.

RAILWAY ACCIDENTS.

A Train thrown off the Rails.—On Monday evening an accident, which occasioned much inconvenience, occurred near the point of divergence to the Croydon line. By some casualty, of which no explanation has been given, the up-train was thrown off the line of rails, and some of the carriages were drawn across the trams used for the down conveyance. The engineer and stoker blew out the fire, and the passengers were, after much alarm and excitement, handed out of the vehicles.

FOREIGN RAILWAYS.

French Finance and Railroads.—We quote the following from the *Courrier Français*:—" M. Mens,

director of the *Société Générale* of Brussels, came to Paris lately to form a company for constructing a railroad between the capital and the Belgian frontier, requiring only from the Government a guarantee of four per cent. on the capital to be employed in the undertaking. The company was formed, the Ministry had come to a decision in its favor, and a bill was about to be presented to the Chambers, when M. Humann put a stop to all, by refusing his concurrence. The Minister of Finance reserves to himself the right of raising his loan at such a period as he may think fit, and fears that the railroad shares may be brought into competition with it. The Government, by way of compensation to the capitalists who were to take the lead in this undertaking, holds out to their notice the railroad between Paris and Pontoise, the plans for which are completed, so that the works may be immediately commenced.

Paris and Rouen Railway.—The principal inhabitants of Havre have authorised a notary of that town to negotiate with companies who may be willing to continue the Paris and Rouen Railroad as far as Havre. The municipality of Havre some time ago voted 20,000f. towards the preliminary surveys, and agreed to devote 50,000f. towards the execution of the line.

A letter from Valenciennes, in the *Echo de la Frontier*, gives a discouraging account of the prospects of the railways in France. Reports of indefinite postponements of the different undertakings to the north of France are beginning to gain credence. The contracts for the works have been postponed, and the minister is represented to look coolly on the projects.

The grand council of the government of Bâsle lately voted, by a majority of 55 against 12, to give the contract for the railway from St. Louis to Bâsle to Messrs. Stehclin and Hubert. This completes the grand line of communication of Alsace, which stops at St. Louis, on the Swiss frontier. This road will afford the first example of a continuous communication by railway between two neighbouring states. It will form an essential part of the line from Strasburgh to Bâsle.

Gratuitous Copies *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

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THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, MARCH 20, 1841.

We last week pointed out the principal difficulties which beset an inventor in obtaining a patent. When the Great Seal has confirmed his right, he enters on a new sea of difficulties, which requires more care in steering clear of danger than his preceding obstacles demanded. He has now to determine by experiment the best means of carrying the principle of his invention into practice. As yet, in case the patent is unopposed, no explanation has been required of the ground on which the claim to exclusive privileges has been conferred. The fees have been received, and the patent has been granted without any inquiry whether there be the least pretension to claim the monopoly. But after the fees have been secured, is considered the fitting time to make the inventor state, and within six months, the nature of his claims, and to describe the mode of manufacturing the article in such a manner, that when his term of protection expires, the public may be unreservedly benefited by the inventor's discovery and skill. He is now, for the first time, allowed to test by experiment the validity of the principle on which he founds his claim. Be the invention trifling or important, the same Procrustean measure obtains for all. The experiments must be concluded, and the best means of perfecting the invention must be described, and the plans drawn, within the time specified, or the patent is lost.

Those only who have encountered the difficulties of perfecting a new contrivance, who have experienced the prejudices of workmen, and the objections to make any article out of the ordinary course of manufacture, can be aware of the obstacles that present themselves in bringing an invention to perfection. To them the time of six months soon elapses, and too often without being able to mature their plans. In this case the specification of the invention is necessarily imperfect, and if future experience suggests any material improvement, it cannot be introduced without incurring the expense of an additional patent.

Allowing, however, that the time has been sufficient, and that the inventor has satisfactorily carried into effect the principle of his invention, he has next to beware that his description of it is correct. The validity of his right to the invention depends on the wording of the specification; and it is no easy matter to avoid the shoals which the technicalities of the law and legal subtlety multiply, for the wreck of common sense and the destruction of equitable claims. The law officers of the Crown afford no assistance to the patentee in securing to him the legal possession of the right for which he has paid so dearly. They take the fees, but render no service in return. The patentee is obliged to consult a legal adviser in making out his specification, and it not unfrequently happens that he is made to pay for unnecessary drawings and plans, to increase the fees of the patent agent, which add materially to the cost of his protected monopoly.

After all these expenses and difficulties have been incurred and overcome, the protection purchased by the inventor for property of his own creation, cannot be depended on with the same security as the possession of other property which is protected by the law, as the commonest right of all subjects of the Crown, without any special purchase. Competing claims, or fraudulent infringements of the patentee's rights, render him peculiarly liable to have his property attacked, and the only advantage he gains by the purchase of his patent is to be permitted to defend himself. Tho Crown, which grants the monopoly, does not defend the grant; and the law officers of the Crown, whose sanction is supposed to be conferred on the invention, do nothing but receive the fees.

Some of the difficulties that present themselves to inventors who desire to reap the fruit of their labors in the only way which is open to them, have been thus briefly sketched. There are other points, more of detail, into which we shall not now enter; those we have enumerated are sufficiently formidable to show the necessity of alteration in the law. In the first place, an inventor has no direct means of ascertaining whether the invention to which he lays claim be qualified by originality as an object for exclusive appropriation; he is prevented from fully testing the principle of his discovery, because there is no protection against piracy until the patent be sealed; he is not in many cases allowed sufficient time to perfect his invention before the mode of manufacturing must bo distinctly specified; he is left to his own resources, and exposed to the mystic subtleties of the law, in the mode of describing and preferring his claim to the right he has purchased; and, after paying a large sum of money for the enjoyment of the right to the property he has created, he is more than any others exposed to injury and robbery. The Crown concedes, without inquiry, a right that ought not to be carelessly granted; it is made a matter of purchase instead of a reward of merit; and after a grant has been sold there are no means adopted to secure the purchaser its enjoyment. Even the Crown itself will invade the privilege it has granted to one purchaser of its favor, by conferring a similar privilege on another; leaving to the first grantee to defend his priority of claim in a court of law.

The law and practice regarding patents of invention present in all these respects the greatest obstacles to the progress of improvement. They prevent the production of many inventions that might be beneficial to the manufactures of the country, and they decidedly check the efforts of inventive genius; as uncertainty, doubt, difficulty, and ultimate insecurity present themselves in return for trouble, anxiety, time, and money.

We are glad to perceive that a step has been taken towards a more liberal system of commerce in our colonies. The Government have proposed to make an innovation in the old system of colonisation, which prevents the colonies from trading with other nations than the mother country. The proposed reduction of the almost prohibitive duties on foreign goods imported, will be the means of increasing the prosperity of our distant possessions; and whilst this measure is adopted for their relief, a corresponding reduction of the protecting duties on colonial produce must be a necessary accompaniment. By thus extending the principles of free trade our manufactures and commerce will be placed on a more substantial basis, and, as the prosperity of the colonies increases, they will afford a more extensive market for our goods, which we trust will never need a protecting duty to procure preference in any market in the world.

NEW INVENTIONS.

WOLCROFT'S IMPROVEMENT ON THE DAGUERREOTYPE.

The process of Mr. Wolcroft, an American, patented in England by Mr. Beard, for quickening the action of the Daguerreotype, so as to produce the effect in a few seconds, is now carried into practice at the Polytechnic Institution in taking likenesses. We attended on Thursday a private exhibition of the apparatus, and had an opportunity of seeing its effects in several instances. The room fitted up for the purpose, is at the top of the building in Cavendish-square. The roof is composed for the most part of large sheets of plate-glass, stained blue to soften the light, and this glass roofing traverses so as to meet the rays of the sun at any part of the day. The sitter is placed on an elevated platform, with a support for the head, and the camera obscura rests on a shelf a few feet distance from him. The construction of the camera itself, as thus applied, constitutes part of Mr. Wolcroft's patent. Instead of using a lens to refract the rays of light to a focus, he employs a reflector, about seven inches diameter. By this means a much greater number of the rays issuing from the object are concentrated within a given space than could be otherwise accomplished, and the image is consequently the brighter. The speculum may also be placed nearer to catch the rays of light than a lens, and this also affords an additional increase of collected rays in the image. The silvered plate, prepared with a coating of the vapors produced by iodine mixed with nitric acid, or with bromine, so as to quicken the action of the light, is put into the focus of the reflecting mirror. The person whose likeness is to be taken keeps his face steady for a few seconds, and the effect on the iodine coating is produced. The plate is then taken away, and excluded carefully from the light until it has been exposed to the vapor of mercury, which attaches to the parts acted on by the light, and the image becomes visible—a perfect fac-simile of nature. Before the plate is exposed to the light, the iodine is washed off, and all further change is thus prevented by exposure. The time occupied by the process varies with the intensity of the light. During the time we were present, some likenesses were taken in five seconds, others occupied twenty, according as the sky was clear or clouded. The difficulty experienced, is to determine the exact time that the plate should remain exposed to the rays of light; for too long a time is equally prejudicial as too short. As there is nothing perceptible on the plate until it has been exposed to the vapor of mercury, the requisite time is at present determined only by trial, and the judgment of the operator. It must therefore require some practice to produce the best possible effects. On Thursday the apparatus was scarcely completed, therefore the results were not in some instances so perfect as they will be when all the arrangements are finished and the operators have more experience of the effects of the light in the new situation; but many of the miniatures were admirable. There is a general tendency at present to a more sombre expression in the copies than in the original, but we doubt not this defect will be soon rectified, by a better adaptation and arrangement of the light, so as to prevent the strong contrast between the lights and deep shadows that now somewhat impair the general effect.

IMPROVEMENT IN LITHOGRAPHIC PRINTING.

The Bavarian Government has just granted a patent for a new lithographic process, to which its inventor has given the name of Lithostérotypie. This process consists in tracing the subject on the stone, with a new black or colored ink, and then pouring on the spaces a combination of acids, which eats away the stone, so as to leave the lines of the ink tracing in relief, greater than that of printing types. From the stone thus prepared any number of impressions, it is said, may be taken by the common press, much clearer than those which are obtained by the ordinary lithographic process; a result arising not only from the higher relief of the lines or characters, but likewise from the fact that the action of the printing press causes less friction than that of the lithographic.

PORTABLE BOATS.

We noticed in a recent number, the invention in France of a portable boat, covered with cloth, which could be readily shut up and carried, though it is capable of conveying several persons safely. We perceive in the *Journal des Debats* of Saturday last, the following account of a further trial of it on the Seine. "An experiment was made last Sunday with the portable cloth boats of M. Leclerc, which was perfectly successful. This little flotilla was conducted from the gate of La Rapée to St. Cloud, without the least damage, and one man alone was sufficient to row the five boats, which carried twenty-eight persons. During their progress, the boats were brought to land several times, and in less than five minutes they were lifted out of the water, taken to pieces, put together again, and again launched. The advantages of this invention are numerous. In the first place, in warfare all rivers may be crossed by its means to reconnoitre, without leaving any trace of its passage; all ships may have on board, without any incumbrance, twenty of these boats, always ready to effect an embarkation. As regards safety, and as a means of rescuing from drowning, a light boat of this kind, weighing only twelve or fifteen kilogrammes, presents great facilities, for being carried immediately to any point where succour is wanted; and these boats would also be found desirable as pleasure boats, as they draw much less water than others, and are consequently more easily managed."

NEW PREPARATION OF NAPTHALINE.

In one of the last sittings of the French Academy of Sciences, M. J. Rossignon presented a paper on napthaline, which substance till the present time has engaged very little attention. It appears, according to the observations and numerous experiments that he has repeated in many different places, that this preparation of carbon will be a good substitute in many cases for camphor; that it possesses qualities even still more valuable; such as preserving grain, woollens, collections of natural history, &c., from the attack of insects. M. Rossignon is able to procure pure napthaline at three francs a pound, instead of five francs the drachm, which has been hitherto the price. He is acquainted with a process, by means of which he is able to procure napthaline in great quantity from the distillation of coals. In the course of his experiments he observed a singular fact. Napthaline triturated with an equal proportion of camphor forms a mixture which becomes fusible by the heat of the hand, though these two substances separately have only a very slight tendency to fusibility. The inventor proposes to substitute this compound for oils and camphorated alcohols.

IMPROVED PREPARATION OF SILK.

The *Courrier de Lyon* gives an account of the application of carburetted hydrogen gas for facilitating the spinning of silk; and also for protecting the worms from injury previously to their being spun. The application that has been made by the engineer, Gensoul, our countryman, of the heating power of steam on spinning the cocoons of silk-worms, is well known. This engineer has, by the substitution of steam for the application of heat direct from the fire, as was previously used in the method of spinning silks, not only effected an entire revolution in this manufactory, regarded in an economical view, but has made very considerable advance in the art of spinning. Gensoul's process, by opening the way to a number of improvements in the art of spinning silk, each more important than the other, has brought to perfection the regularity and fineness of this valuable thread, which forms so important a branch of the trade, we may almost say of the prosperity, of our town. At present a new method is announced which appears likely to supersede steam. In one of the last sittings of the Royal Society of Agriculture and Useful Arts, at Lyons, a paper was read proposing the substitution of bi-carburetted hydrogen gas instead of steam, and to continue spinning day and night, so that the spinning factories, which, according to the usual method, are kept at work four months, and sometimes more, will finish the spinning of all the silk in from 50 to 60 days, which would apparently be attended with a considerable saving of expense from waste in the spinning, which increases in proportion to the length of time before it is completed. A great saving is also anticipated from fumigating the cocoons with the gas, as it will protect them from the moths and worms, and also from the attacks of vermin.

MITCHELL'S PATENT SCREW MOORINGS.

On Tuesday last a trial was made of the holding power of Mitchell's Patent Screw Moorings, as compared with anchors, on the sands, at low water, below Hawk's iron factory, in presence of the Master and Brethren of the Trinity House, some members of the river committee, and several gentlemen interested in the port of Tyne, when it was proved in the most satisfactory manner the great superiority these moorings possess over any hitherto used. A small model of the screw-mooring, one foot in diameter on the flange, and thirty-five pounds in weight, when screwed only two feet into the ground, was proved to have greater power of holding than an anchor of three hundred and forty-eight pounds weight, the anchor dragging rapidly through the sand, while the mooring remained immovable, the same test or strain being applied to each. Another trial was made with a screw only eight inches diameter, and fourteen pounds and a half in weight, against an anchor of 189 pounds, when the screw mooring was again successful in

dragging the anchor home. When we compare one of the three feet six inch screws, which offers a resisting surface twenty-seven times greater than this model, and also the extraordinary depth to which it can be screwed into the ground, amounting in some cases to sixteen feet, we feel convinced that no one will doubt its superiority. Another most important advantage that this mooring possesses, is perfect safety for ships grounding over them, as nothing but the chain stands above the surface of the ground, and in a shallow river like the Tyne, this is a most important advantage, as by the use of these moorings the ship's anchors would be removed from the bed of the river, which at present forms one of the greatest impediments to its navigation.—*Tyne Mercury*.

IMPROVED GALVANOPLASTIC PROCESS.

The *Journal des Connaissances Necessaires*, gives, from a scientific correspondent, the following account of a simple process he has adopted of obtaining casts in copper by galvanic action.

"In several numbers of your journal you have communicated various galvanoplastic processes. Some of them are complicated and expensive, and others are not quite successful; yet by the aid of these previous experiments I have discovered a very simple process, which is not expensive, and which produces an admirable effect. I can guarantee its correctness. The experiment is as follows: I make a small wooden trough, which I divide into two parts by means of a small sheet of parchment, which I fasten to the sides and to the bottom with wax or grease. The apparatus thus prepared, I put some water containing a few drops of sulphuric acid into one side of the trough, and into the other a saturated solution of sulphate of copper. I then take a wire of copper or lead, at the end of which I fasten a piece of zinc about the size of a large walnut, and at the other end I fasten the medal from which the cast is to be taken. I plunge the end to which the zinc is attached into the acidulated water, and the medal, which is at the other end, into the solution of copper. Immediately re-action takes place; and the galvanised copper begins to adhere to the medal. It is requisite to proceed slowly, and not to pour more than a few drops of the acid at a time into the water in the trough containing the zinc. I pour them only every five or six hours, the night excepted. Not less than four or five days are requisite for the complete success of the operation. Every twelve hours I change the solution of sulphate in order that it may be always of the same strength. I change the solution in the following manner: by means of a syphon made of a small branch of wood I draw off all the solution. I put it in a bottle containing an excess of sulphate of copper, and I afterwards fill the small trough with the solution which comes from the top of this salt. By this means the water always maintains the same degree of saturation. When the operation is performed on medals containing copper, it is previously necessary to put one or two drops of wax upon them, to heat it a little, and to spread it gently and regularly with the finger.

"I think that a solution of pure wax in ether would be well adapted for this purpose. Care must be taken not to put too much wax on the medal, for in that case the copper would not be deposited on it. The side on which no impression is taken should be entirely covered with wax. In order to remove the layer of copper deposited on the medal with facility and without breaking it, it is sufficient to place the medal over a slow fire to heat it, and then let it get cold. Then raise the copper-plate gently, and it is easily removed. By adopting this process I have obtained the impression of a medal, the execution of which is perfect, at an expense of less than two centimes. I have also obtained in copper a very complicated tube for a chemical apparatus.

"I think that this discovery may be very useful to science and the arts. I shall in a short time make an attempt to cover a small statue in plaster with galvanised copper."

SCIENTIFIC CORRESPONDENCE.

RECIPROCATING ACTION.

To the Editor of the "Inventors' Advocate."

SIR,—Allow me to reply to some of the remarks you have made on my letter, on "Reciprocating and Rotary Engines;" and as it is a subject of much interest, in the present absence of other advocates I must beg leave to continue the subject.

I do not fancy that I have at all misapprehended the view you took of the subject, but rather wished to settle the first question, as to whether there is, or is not, a loss of power by reciprocation, before I replied to the more important and abstruse one of the crank action. On the first question, however, I do not appear to have satisfied you, and shall, therefore, add a few other remarks.

You say, that to enable a reciprocating steam-engine to work without any loss of power by the *reciprocating action*, it is necessary that the whole of the momentum each way be exhausted by the time the piston arrives at the top and bottom of every stroke, "and that all the other reciprocating parts of the machinery should be gradually brought to rest before the new motion is given" Now I maintain that such is actually the case, and, consequently, that were the beam suddenly disconnected at those points it would have expended *all its momentum*, and cease to move, just as much so as a ball after having run down an inclined plane or curve, and up another of the same height, would have lost all "inertia." To maintain otherwise would be to consider perpetual motion possible, but that I will not pay you so ill a compliment as to tax you with. Whatever momentum the moving parts acquire in describing the first quadrants is advantageously and wholly expended in the others. Why should there be an excess? for the curves and progressive ratio of the velocities are the same, though one is direct and the other inverse; and it makes no difference whether the beam is heavy or light, the movement slow or fast, excepting of course that power which is lost from extra friction.

This question of reciprocation is entirely independent of the positions you have advanced respecting marine and locomotive engines, expansive or otherwise. If there is a loss of power in the beam engine, there is in every other form of reciprocating engine.

Now for a few words on your concluding remarks. I am about the last to check inquiry, or to throw any obstacles in the way of improvement. It is indeed one of my greatest sources of pleasure; neither do I consider that we have arrived at perfection. Far from it; the creature cannot be equal to the Creator. We are allowed to approximate towards perfection, but shall never attain it. I merely contend that there is less loss of power in the reciprocating engine than it will be possible to arrive at in any rotary one. I trust these additional remarks will be satisfactory; and if so I shall be happy to continue the subject on the crank action. I am, Sir, your obedient servant,

Norwich, 15th March, 1841. F. HAM, C.E.

[Mr. Ham's statement of facts, and his application of them, are certainly not satisfactory to us. If, as he asserts, all the momentum of the steam in a steam-engine is expended, and "all the parts are brought gradually to rest before the new motion is given," we grant that there is no loss of motion by reciprocating action. We before stated that such an adjustment of steam power to the work to be done is within the verge of *possibility*; but we much question whether it is ever effected in practice. We do not perceive how the action of a pendulum, or of a ball descending one curve and ascending another, can be applied to the determination of the present question; for the point in dispute, as regards the steam-engine, is, whether or not the momentum be exhausted, respecting which there is no doubt in the pendulum. We fear we do not clearly comprehend the extent to which Mr. Ham carries his position, that no loss of motion accompanies reciprocating action. If our reading of his letter be correct, he maintains that there is no loss of power by reciprocation, even when the steam is worked at full pressure. If this be his opinion, we shall be curious to see the arguments by which he supports it.]

IS PRESSURE DIMINISHED BY MOTION?

To the Editor of the "Inventors' Advocate."

SIR,—I cannot agree with you in thinking that a ball rolling rapidly over a level surface does not press on each point of that surface with its whole weight; nor do I think such a supposition necessary in order to explain why a weight heavy enough to fall through a thin sheet of ice, if suffered to *rest* on any point of it, may *glide* or *roll* rapidly over the same surface without breaking through. The true explanation of this fact depends, I think, on the circumstance that the fall of a body through any given space requires a certain time; and that the motion of a falling body at the commencement of its descent is extremely slow. A ball, resting on ice not strong enough to support it, occupies certain instants of time in depressing the ice as far as its elasticity will allow it to bend without breaking. If precisely at the instant that this point has been reached, the weight of the ball be suddenly removed, the ice will not be broken, nor further bent, but, being relieved from pressure, will return by its elasticity to its original position. This effect will equally take place whether the pressure be removed by lifting the ball from the ice, or by transferring it by a gliding or rolling motion to another point of the surface. Only in the second case (which is the one at present under discussion) each successive point of the ice over which the ball passes will undergo a depression precisely equal to that of the first, never exceeding the pliability of the ice, and therefore never occasioning fracture.

You or I, Mr. Editor, at a ten minutes' mail-coach dinner, cannot be said to have walked the less vigorously into a sirloin of beef, because time was not allowed us to make so deep impression as we could have wished. We should think it a cruel mockery if the landlord should pretend to argue the feebleness of our appetite from the small quantity we had been able to eat; and it seems to me equally unjust to infer, that a rolling ball presses less heavily than one at rest, from the fact, that in its rapid passage it produces an inferior effect.

I am, Sir, your obedient servant,
ROLLING STONE.

[The question of the diminution of pressure by motion was fully considered in the 60th and subsequent numbers of our Journal; to which we must refer our correspondent. We appear to differ more in forms of expression than in substance, for our position, that time is requisite to produce pressure, seems also to be admitted by himself. The facetious illustration of ROLLING STONE "gathers no moss" for his objection to our views, but might be advanced as confirming them. We contend, as well as he, that time is an essential element to be taken in consideration, whether it be required to "walk into a sirloin of beef" with a knife and fork, or to act on the surface of congealed water with the force of gravitation.]

TO THE EDITOR OF THE "INVENTORS' ADVOCATE."

SIR,—Having occasion to use iron and timber combined, in the building of vessels, it has been proposed to Kyanise the timber preparatory to its being attached to the iron. An objection has, however, been started, that the timber so prepared will injure the iron with which it comes in contact. Knowing your anxiety to answer the questions of your subscribers, and your knowledge and scientific acquirements, may I solicit your opinion as to whether or no, timber thus prepared will injure iron, the timber and iron being bolted together.

I am, Sir, yours most respectfully,
7, Broomfields, March 17, 1841. A. L. S.

[We do not think there is any force in the objection raised to the Kyanising process on the ground of its inducing the oxidation of the iron.]

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING MARCH 22, 1841.

Monday	Geographical Society	9	P.M.
	British Architects	8	P.M.
Tuesday	Medico-Chirurgical Society	8½	P.M.
	Civil Engineers	8	P.M.
	Zoological Society	8½	P.M.
	Architectural Society	8	P.M.
	Royal Botanic Society	8	P.M.
Wednesday	Society of Arts	7½	P.M.
	Geological Society	8½	P.M.
Thursday	Royal Society	8½	P.M.
	Antiquaries Society	8	P.M.
	R. Society of Literature	4	P.M.
Friday	Royal Institution	8½	P.M.
Saturday	Westminster Medical Society	8	P.M.

ROYAL INSTITUTION.

March 12. Friday Evening Meeting.

Mr. Williams delivered a lecture "On the Origin and Progress of Coinage," in which he took a brief survey of the causes which led to the art of coinage, and he endeavored to trace it in a very general manner from the most ancient up to the present period.

He divided the discourse into three portions or periods:—1. The causes which led to the invention of the art among the Greeks. 2. The Roman coinage. 3. The decline of the art as practised by the ancients, and its gradual rise to the present state of perfection.

In all countries before the introduction of money there has always been a system of *barterage* practised. In many parts the shell known as the Cowry (*Cypræa*) is employed for this purpose. Among the South Sea Islanders peculiar kinds of feathers are used; and seeds of plants and other natural productions are also made use of in the absence of coin; in some parts of the world, among the aborigines, this system of barter is still in vogue. It has been generally observed that the articles selected for this purpose are not very easily obtained, although they may be procured in sufficient quantities to answer the end required. They are likewise not easily broken, or injured by damp or other elementary causes of decay. These qualities are especially found in gold and silver, and they are hence called the *precious* metals.

There is every reason to believe that silver was first employed for coins by Abraham, who it is said paid 400 shekels of silver to purchase a cave and field for his family. Silver is recorded to have been used in exchange about 1680, before the Christian era. Mr. Williams, in alluding to several scriptural quotations in which the words "pieces of money" are used, gave as it his opinion that the word silver should be used throughout the text instead of *money*. He also considers that each piece was of a given weight. With respect to the origin of money, Mr. W. considers that some state or city first issued a stamped coin of certain purity, value, and weight, which took its rise with the Greeks, who constructed some of the finest specimens ever witnessed, and hardly to be surpassed at the present day. There are several accounts on record of punishment having been inflicted for forgeries committed even in those days; and there appears to be no doubt existing as to forging being coeval with coinage itself. Although the Egyptians and Etruscans used seals and signets, there is no decided proof that they had money of any description.

The individual who first invented this art is not correctly known; Python of Argus is considered by the Greeks as the inventor; it rapidly however spread far and wide among their neighbours. Almost every town and state had its coins; they are very various both in size and form; possessing on one side a head, as in that of Athens, which has the head of Minerva on one side and an owl on the other. That of Rhodes has the head of Colossus on one side, and Rhodes on the opposite. The coins of cities have either the name of the city in full upon them, or abbreviated, such as the first letters, and also occasionally having *monograms* stamped on them. Some ancient coins of one state, were used in that of another state, by being countermarked in the same manner as the Spanish dollars were current in this country some years since after the head of King George III. had been stamped upon them. Of the Greek coins the largest was that about the diameter of the crown or five shilling piece, and the smallest weighed only three or four grains.

The Romans received the art from the Etrurians, and their coins had always perfect reverses; they came into general use about 400 or 500 years before the Christian era; the largest weighed a pound weight (12 oz.) and was of silver; there were others of different sizes and value, and the weight was always marked on the coin by globules, indicating the number of ounces. After the first Punic war the largest piece weighed only *two* ounces, and after the second only *one* ounce. The Romans had several kinds of coins in use, the *Imperial Medallions*, which were usually struck in honor of some commemoration, and *copper* coins of various degrees of value.

The Roman coins are of the greatest interest, as each in some way or other exemplifies some great event which happened at the time it was made; they have been found of the most essential service in deciding ambiguous points in history.

Mr. Williams concluded by stating the modes employed by the ancients to produce coins. The earliest coins of the Greeks were evidently *struck*, and those of the Romans *cast*; in the latter case the point at which the metal was poured into the mould can be readily seen, as also the marks where the mould separated. On some Greek coins can be recognised the implements used, such as two blocks between which the die was placed, and a large hammer by the side to strike them together, as also a pair of pinchers, which goes far to prove that they must have been used hot. The coins of the Latins, as before noticed, were cast; some of the moulds have been found in Yorkshire, and described by Mr. Bree, others in France, &c.

The state of the art of coinage was very low at the end of the Roman era, and after the reign of Constantine the art declined very much indeed; about the time of Edward III. it began to improve; and in the reigns of Henry VII. and VIII. it arrived at greater perfection. On the lecture table Mr. Williams exhibited a very complete and beautiful collection of casts, the result of much time and labor in their execution, which we believe were all the work of the indefatigable amateur Mr. Williams.

In the library were some interesting "Calotype Photogenic Representations," from Mr. Fox Talbot, surpassing any of the kind we have hitherto observed.

The lecture announced for March 19, was "Mr. J. T. Cooper, on Mr. Elkington's mode of Gilding and Silvering Metals."

SOCIETY OF ARTS.

March 10.—Illustration Meeting.

Mr. Smith delivered a lecture on the "Mechanical Processes of Sculpture." He prefaced the discourse with an account of the art from the earliest periods of its history. It is very uncertain at what particular period stone was hewn into forms representing man. Sculptured writings were the first kind used by primitive nations, and of all nations the Phœnicians approached nearest to perfection. The introductory remarks on the rise and progress of the art were of a lengthy character. The first sculptures were made in wood, but owing to its liability to decompose, soft sandstone was afterwards employed, and the tools used were portions of broken flints, stones, &c. In Egypt some statues were wrought in granite, although most were constructed of sandstone, and hewn out of the solid rock. In illustration of this practice a diagram was exhibited representing an enormous temple which had been worked out of solid ferrugineous sandstone, the natural inclination of the strata being at an angle of about 45 degrees The height of the figures measured from 80 to 90 feet; a plaster cast of the head of one of them may be seen in the Egyptian Gallery of the British Museum. The Egyptians were more renowned for the size, than for the grace, elegance of action, or correctness in execution of their statues; they very much, however, improved after the Ptolemies, introducing into their works of art, and combining more of the Grecian style.

Dædalus was the first who made the legs of statues separate from each other, as in the act of walking; and he is generally described as the sculptor who made "walking statues." About five centuries before the Christian era the Greeks constructed the finest statues ever made; and it was asserted that Vidius could never have executed all the statues ascribed to him, had he not possessed some mechanical contrivance to break away the stone. This subject is, however, in oblivion. Pliny and other writers assert that they were acquainted with a material analogous to plaster of Paris, and that they were also in possession of tools somewhat similar to those in present use; but this is very ambiguous.

The best statues executed since the time of the Greeks were those made in the 14th, 15th, and 16th centuries, by the Italians. Baptiste Alberti, in the 15th century, published the first account, giving the details of the art, which appeared illustrated with an engraving, exhibiting the mode at that time adopted to take the points, as now termed by sculptors, and which is even practised with very trifling modifications at the present day. B. Alberti was born in 1398, and died in 1485, and the work above mentioned is believed to be the first one published on the subject.

The manner of executing statues in stone and modelling was then alluded to. The mind and talent of the artist are the most necessary qualifications for the sculptor. The plan adopted is to make, in the first place, small models, to serve as patterns for larger ones in clay. A plaster cast is then made of the latter, and this is placed under the same circumstances as the block of marble or stone. In roughing out the figure in stone much labor is required, as there is as much stone usually removed by this process as there remains to form the statue; this is generally done by masons, and not by the sculptor. Usually clever ingenious workmen are employed for this purpose, it being necessary to be exceedingly accurate in chipping the material. All the most talented artists of the present day work from models, and there is every reason to believe that the ancients made use of them, both for expedition, and to have more time to execute better works.

In the work of Alberti there is a figure and description of a graduated circular frame, to be placed on the head of the copy and the cast, from which lines with lead at the end are suspended in different situations, and from which the artist takes his points by means of a flat stick and charcoal, or by a pair of large forceps. This kind of frame,

modified to a square instead of a circle, was used invariably in Italy. It is, however, objectionable, because the slightest touch moves the lead lines. This system was in general practice in England until the year 1764, when the elder Bacon departed from the dial plan, and introduced a contrivance of his own, the principle being the same as that used at the present day. Mr. Benys's machine was simply alluded to, but it has not been found generally useful; and likewise that of Sir F. Chantrey, which differs from all; it is suspended by east-iron frames from above, and possesses a greater extent of motion than either of the forms hitherto devised. Mr. Smith considered that it possessed all the required advantages.

LINNÆAN SOCIETY.

March 16.—*R. Brown, Esq., F.R.S., V.P., in the Chair.*

The Marquis of Northampton was admitted a Fellow of the society, and Mr. R. Kane duly elected by ballot. Mr. Cameron, A.L.S., of the Botanic Garden, Birmingham, forwarded for exhibition many specimens of plants in flower, of an interesting nature. Mr. Mann exhibited living specimens in flower of *Draba aizoides.* A paper was read from the Rev. M. J. Berkeley "on some Fungi from Terra del Fuego," collected by Mr. Darwin during his travels in that part. Mr. Berkeley exhibited a new genus and two new species, and has ascertained the place of them in the Mycological system; two drawings accompanied the notes, which were principally taken from the loose memoranda made by Mr. Darwin. In the beech forests of Terra del Fuego the troes were much diseased with these fungi. The first described were round, of a yellow color like the yolk of eggs, varying much in size, and found usually on the excrescences of the trees; they are much used as food, and were collected by the boys, who eat them uncooked with fish. The young appeared in September, and were round and smooth, but when more advanced in age they became honey-combed, and were filled with brown fibrous matter. Some of the balls remained on the trees all the year, and are much infested with larvæ. Captain Fitzroy noticed them in the month of June.

The second species described by Mr. Berkeley was found in woods on the Chilian oak, and is somewhat similar to the last mentioned. It has, however, a much larger and longer foot-stalk, and in its young state the internal eavity is not infested with larvæ. The botanical characters of these species concluded the paper.

A letter was read from Mr. Joseph Woods, of Lewes, addressed to Mr. Kippist, being notes and remarks on the British species *Barkhausia Taraxicifolia* and *Crepis biennis*, in which he is inclined to consider them as two very distinct species, after carefully examining and investigating the characters afforded by the seeds, &c. Mr. Kippist read some notes on the subject, after having compared the specimens with those in the Linnæan Herbarium, and those also in the collections of Smith, Winch, Woodward, &c. An extract of a letter was read, addressed to Mr. John Miers, from Mr. Gardner, who is now travelling in Brazil, detailing the route he has recently taken, and the success he has met with. Mr. Gardner is expected to return to this country (which he left about three years since) in the course of two or three months, with his collection of plants.

CHEMICAL SOCIETY OF LONDON.

On the 23d of February last a meeting was held of gentlemen desirous of uniting themselves for the purpose of forming a Chemical Society. At that meeting the following gentlemen were appointed as a provisional committee for carrying this object into effect:—Messrs. A. Aikin, W. T. Brande, H. J. Brooke, J. T. Cooper, J. Cumming, J. F. Daniell, T. Everitt, T. Graham, W. R. Grove, H. Hennell, G. Lowe, R. Phillips, R. Porrett, R. Warrington.

A circular of this newly-forming body has been forwarded to the experimental chemists, inviting them to join this society as original members, and to support it with their active co-operation. The circular also requested a reply to the communication forwarded by the secretary (*pro tem.*) before the 23d of March, and if the answer should be in the affirmative, inviting them to attend the first meeting of the society on the 30th of March, in the rooms of the Society of Arts, John-street, Adelphi.

We subjoin a list of the proposed objects which this society intends to embrace:—

The promotion of chemistry, and those branches of science immediately connected with it, by the reading, discussion, and subsequent publication of original communications.

The formation of a chemical library and museum

Proposed annual subscription for members' resident within 20 miles of London £2, beyond that distance £1.

We understand that original members will not have to pay any admission fee.

THE ARTESIAN WELLS OF GRENELLE AND CESSINGEN.

The *Fanal* makes the following comparison between the Artesian well at Grenelle, near Paris, and the well at Cessingen, in Belgium, for the purpose of depreciating the former work, and showing the superiority of the Belgian workmen, in this department of underground operations:—

"The Artesian well of Grenelle required 7 years, 1 month, and 26 days, to attain the depth of 1,650 feet; the well at Cessingen, in Luxembourg, was finished in 2 years, 1 month, and 6 days, and is 1,800 feet deep. The expense of it amounted only to 116,000 francs, 16 centimes; the well of Grenelle will have cost the town nearly half a million; the implements alone are worth more than a hundred thousand pounds. The ground at Cessingen was quite as difficult to penetrate as that of Grenelle. At Cessingen, the sounding tool broke 76 times; at Grenelle, only four times. The progress of the boring at Cessingen was at the rate of 70 centimetres a day; the average progress of the well of Grenelle was only 21 centimetres a day. This short statement is sufficient to prove how much greater progress has been made in the art of boring in Belgium than has been made in France. Rost and Biver are the names of the men who bored the well of Cessingen, and who would willingly undertake, for 100,000 frs., as many wells as would be required in the basin of Paris, with the wooden rods, of which they are the inventors. But it would be more advantageous to send for sounders from China, who, for from 10 to 20,000 frs., dig wells in the rock, of from 2 to 3,000 feet deep. In short, it is evident that the Chinese system of boring, by means of a rope, towards which the rods of wood are only an approach, ought every where to be substituted for the bars of iron, as thick as the axle-trees of wagons, and weighing from 15 to 20,000 kilogrammes, which were employed at Grenelle. These bars can only be used advantageously for commencing the work where the soil is soft.

ANTARCTIC EXPEDITION OF DISCOVERY.

It may be recollected that the Erebus and Terror discovery ships sailed from England about 18 months ago, under the command of Captain James Clark Ross, R.N., and Commander Crozier, their main and ostensible object being to ascertain the true position of the South magnetic Pole, and the exploration of the Antarctic regions, of which a very imperfect knowledge has hitherto been obtained, but a series of magnetic observations were also directed to be made at different stations on their route, and the first of which being at Madeira, they put in there and stopped several days. Thence they proceeded to St. Helena and the Cape of Good Hope, at which places they fitted up observatories, and left officers of sufficient scientific acquirements to superintend them. Kerguelen Land was the next spot they visited, where, and at Sabrina Land, further observations on the magnet were made, and they arrived safe at Hobart-town about the middle of last August. There Captain Ross met his old friend Sir John Franklin, the Governor, from whom he received every possible attention and assistance, and there also having erected and fitted up an observatory, they proceeded on their voyage about the 26th of October, that being the date of their last letters, at which time they were on the eve of their departure. Captain Ross, the nephew of Sir John Ross, is the same officer who, in June, 1831, planted the British flag on the North magnetic Pole, and has, in his several voyages to the arctic seas with his uncle and Sir Edward Parry, passed eight winters and fourteen summers in those dreary regions; so that this arduous and important duty could not have been confided to a more experienced or intelligent officer. It appears that on their arrival at Hobart-town they learnt that since they left England two expeditions had been fitted out, one by the French, and the other by the Americans, for the apparent purpose of anticipating the objects of discovery in those seas; but the ships having been ill suited to encounter the ice-bergs, and their commanders never, it is believed, having seen any before, they gave up the pursuit, to be accomplished, it is to be hoped, by our own intrepid countrymen. It is known to be Captain Ross's intention to go direct to the South Pole, which he expects from calculations made before he left England, to find about South latitude 68, East longitude 144; and it is believed that observations since made nearer the spot tend to confirm him in the same opinion.—*Times.*

WINES OF PALESTINE.

BY PROFESSOR BECK.

In the discussions which have recently taken place concerning the chemical nature and effects of wines, some opinions have been advanced concerning the wines of Palestine, which deserve a little consideration. It has been supposed that the wine spoken of in the various parts of Sacred History was far less spirituous than that of modern times; and some have even gone so far as to assert that all modern wines are *brandied*; and that to this circumstance is to be ascribed the large proportion of alcohol which they are found to contain. Upon consulting the original papers of M. Brande, however, it will be found that that acute chemist was not ignorant of the fact that many wines are artificially brandied; and as the very object of his researches was to prove the existence of ready-formed alcohol in natural wines, he would, of course, be careful to select those which were free from admixture. Indeed, he expressly states that he used this necessary precaution; and, moreover, Gay Lussac, though in the very country where many of the wines analysed by M. Brande were produced, confirms and quotes his results, without expressing the least doubt of their accuracy from this cause. It is, therefore, probable, that in most of the wines which were examined by M. Brande and myself, the whole amount of alcohol was due to the fermentation of the *must.* The differences in this amount depended upon the kind of grape, and upon the influence of climate, soil, and culture. These facts being assumed, we shall have some guide in our subsequent inquiries.

The wines of Palestine are generally represented by modern travellers as being of excellent quality. The sweet wines are particularly esteemed in the east, because they are grateful to the taste, very exhilarating, and will keep some of them for a long time. They were therefore preferred by those addicted to drinking, and commonly selected for the tables of kings (*Paxton's Illustrations*). The prophet Joel, accordingly, describes a state of great prosperity by the figure of mountains dropping

down new, or, more correctly, *sweet* wine, (c. iii. v. 18.) Their inebriating quality is alluded to by the prophet Isaiah:—"I will feed them that oppress thee with their own flesh; and they shall be drunken with their own blood, as with sweet wine." (c. xliv. v. 26.) The privation of their enjoyment of drinking this wine is placed by the prophet Micah among the judgments which the Almighty threatened to bring upon his ancient people for their iniquity:—"Thou shalt tread the vintage of sweet wine, but shalt not drink wine."—(c. vi. v. 16.)

Thus the testimony of travellers, concerning the spirituous nature of the wines of Palestine, accords with that of the Sacred Writers. The ancient wines are said to have been mixed with water for common use; but it is evident that this practice did not prevail among the Jews, for Isaiah, in mentioning a mixture of wine and water, evidently means to express by the phrase the degenerate state of his nation: "Thy silver is become dross; thy wine mixed with water." (c. i. v. 22.) It is observed by Thevenot, that the people of the Levant never mingle water with their wine at meals, but drink by itself what water they think proper for abating its strength. While the Greeks and Romans by mixed wine, understood wine united and lowered with water; the Hebrews, on the contrary, meant by it wine made stronger and more inebriating, by the addition of powerful ingredients, as honey, spices, &c., or wine inspissated, by boiling it down to two-thirds or one-half of the quantity, myrrh, opiates, and other strong drugs being added —(*Paxton's Illustrations.*) And severe denunciations against the use of this drink are contained in various parts of the Sacred Scriptures.

Moreover the grapes of Palestine were remarkable for their size and richness. The account given by Moses of the bunch of grapes brought by the spies to the Israelitish camp, (Numb. xiii. 24,) is confirmed by the statements of several travellers. Doubean assures us that in the valley of Eshcol were bunches of grapes of ten or twelve pounds. Forster tells us, that he was informed by a religious man, who had lived many years in Palestine, that there were bunches of grapes in the valley of Hebron so large that two men could scarcely carry one, *i. e.* without bruising or blemishing the berries. Indeed, travellers generally concur in their high commendation of the grapes of that country.

To these facts I will only add, that the wines of Palestine were generally kept in bottles made of leather or goat skins, firmly secured or pitched together. In these the process of fermentation took place, and the wine acquired its proper degree of strength.

In the absence of any thing like chemical analyses, these are the data from which we must draw our conclusions concerning the nature of the wines referred to by the Sacred Writers. Some of them are represented to have been sweet wines, which, if not the strongest, are known to be among the stronger kinds. The grapes from which they are produced, were remarkable for their richness and excellence, the climate of the country being such as to favor their growth, and the development of those principles which during fermentation are converted into alcohol; and as the grapes of that country are known to furnish very rich and spirituous wines, we may infer that the ancient wines were similar in their character, since there is abundant evidence that the climate has not suffered any material change for 3000 years.

I should not omit, in confirmation of this view of the spirituous nature of the wines of Palestine, to advert to the modes in which they were kept. It is now well known, that, when mixtures of alcohol and water are put into bladders, the water evaporates, and leaves the alcohol in a more concentrated form; and it is asserted that wine, which has been kept in bottles closed by pieces of bladder firmly tied over the mouth, in a few weeks acquires the strength and flavor which would be imparted to it only by several years' preservation in the ordinary way. Now it is probable that the leathern bags into which these wines were put would produce a similar effect upon the liquor, which, after the process of fermentation had ceased, would soon attain its complete and appropriate alcoholic character.—*American Journal of Science and Art, Vol.* 28.

SCIENTIFIC MEMORANDA,
AND
NOTES ON ART.

Influence of Pasturage on Wool.—It is well known to English wool collectors and manufacturers of cloth, that pasturage has a powerful influence on the nature and properties of the fleece. By way of example we will suppose half a flock of Southdown sheep, reared in the centre of the South Downs (known to be calcareous and chalky land), and the other moiety transferred to some of the rich land found in the neighbourhood of Pevensey Levels, near Lewes. The contrast that would be perceptible in the fleeces of these two portions of the same flock, when shorn, is inconceivable to those who have not had an opportunity of witnessing the powerful influence of a change in pasture on the wool of sheep. Both the temperature of climate and herbage have an evident effect on wool, as may be seen in England on that of those flocks pastured within a few miles of the sea coast, beginning with the Isle of Sheppy, &c., round the coast of Kent, Sussex, Hampshire, &c. The wool of flocks which are fed within ten miles of the sea coast generally possesses a longer staple and more pliancy of texture, and consequently it is better adapted to the use of the spinner than the produce of the same flock pastured further in the interior on a similar soil. This difference is imputed to the exhalations arising from the sea, which, like the smoke of London, extend inland at least ten miles, thus operating on the herbage as well as on wool. An enlightened gentleman, well acquainted with the cotton plant in the United States, and with cotton wool in general, states that the sea air has the same influence on the cotton plant as on the wool of sheep. The sea island cotton is the strongest and the longest, and consequently best suited for spinning; and when the plant is removed from its favorite soil and transferred to the interior, the wool becomes tender and of a different quality. It may also be added that the change produces another species of cotton wool.—*Sussex Advertiser.*

New Quicksilver Mines.—It is reported that more than one quicksilver mine has just been discovered in the province of the Asturias.

Discovery of Petrified Human Bones.—Dr. Lund, now residing at Lagoa Santa, in Brazil, states that upon a late journey into the interior of Brazil, he had, for the first time, met with human bones, in conjunction with the bones of acknowledged extinct animals, which must be of an extraordinary antiquity, perhaps the oldest human bones that have ever been found; for they are in part petrified, and in their preserved condition altogether correspond with those of the extinct animals, in connexion with which they were found. They will, he observes, throw a light on the nature of the inhabitants of this part of South America, in times which go much farther back than our knowledge of this part of the world. The formation of the cranium is extraordinary, inasmuch as the forehead does not rise in the same plane with the face, but forms a considerable angle, by which peculiarity they differ from all craniums of living races of men, and resemble the depressed heads represented in the ancient drawings of the Mexicans. In connexion with the extraordinary bones, was found a hemispherical shaped stone, quite polished on the under sufface, which had evidently been used for rubbing.

Diamond Mines of Golconda.—A paper descriptive of the tract of country in which the diamond mines of Golconda are situated, and of the processes by which the diamonds are obtained, has been presented by T. J. Newbold, Esq., to the Royal Society. The process by which the diamonds are obtained, consists merely in digging out the rolled pebbles and gravel, and carrying them to small square reservoirs, raised on mounds, having their bottom paved with stones, and then carefully washing them. Dry weather is selected to carry on these operations, in order to avoid the inconvenience and expense of draining.

Lead Ore in Glamorganshire.—"The *Cambrian* observes: It seems somewhat extraordinary, that in this speculating age, when such vast sums are sent to seek—and too often to sink—their fortunes in a far distant region, that our home treasures should be so disregarded, even our own county of Glamorgan. Lead ore, of the purest quality, which can even be scraped up by the sides of the road, in ditches, and abundantly a few feet beneath the surface of the soil, still continues to be dormant—science, capital, the gigantic power of the steam-engine, all alike dormant. St. Hilary, Colvinstone, Langan, Penlline, and other parishes, abound in lead ore. Take up a handful of earth near any of the old pits, and it is full of lead ore. Twenty-five years ago, it was asserted by the oldest persons then living, that the working of the lead mines on the Penlline Court Estate was suspended (now from 80 to 100 years ago) in consequence of the overwhelming pressure of water, years before the steam-engine, with its gigantic power, came into play, and that the main vein of ore at the time was thirty-seven inches in thickness. The ore was then carried above half a mile to be washed, and taken back again to the smelting-house, which adjoined the pits. The steam-engine would now admit of the ore being washed upon the spot."

Iron Ore.—The iron ore trade in the neighbourhood of Ulverston is remarkably brisk at the present time. Messrs. Kennedy and Co. are, we understand, in a vein of ore of great richness, in the working of which they are, however, in some measure, retarded by the presence of a heavy flow of water. To remove this obstruction, the spirited proprietors are about to erect a steam-engine, on which the engineers are at present employed.—*Mining Journal.*

Horticultural Society of London.—On Tuesday evening a numerous meeting of the nurserymen and florists in the neighbourhood of the metropolis was held at the Crown and Anchor Tavern, Strand, for the formation of a new society, under the above title, for the periodical exhibition of flowers and specimens. Several resolutions organizing the new society were agreed to.

At the meeting of the Horticultural Society on Tuesday, Mr. Lane, of Great Berkhampstead, exhibited fifty-four varieties of roses in full and perfect bloom; the richness of scent in many being unequalled in any previous exhibition. The roses were principally grown in pits.

The Senatus Academicus of the University of Edinburgh recently conferred the degree of LL.D. upon M. Vladimir Davidoff, Chamberlain to the Emperor of Russia, and one of the most eminent noblemen of his country, on occasion of the presentation of his magnificent work on Greece to the library of that University, of which, not many years ago, he was a very distinguished alumnus.

Electro-Magnetic Engine.—The *Mayence Gazette* states that the Germanic Diet has voted a recompense of 100,000 florins (250,000 frs.) to the inventor of the electro-magnetic machine, to supersede steam-engines.

Earthenware made by Machinery.—A machine—the second or third already finished under the direction of the inventor—is now completed, and about to be sent from the works of Messrs. Whitworth and Co., machine-makers, of this town, to the Staffordshire Potteries. This machine, by the application of a power hardly equal to the strength of a boy, will mould and prepare for reception in the pot-house six pieces of ware in one minute, or upwards of 4,500 in a day of twelve hours.—*Manchester Advertiser.*

British Museum.—The number of visitors admitted to view the general collections from Christmas 1839 to Christmas 1840 amounts to 247,929, being 32,921 less than in the previous year. The number of visits made to the reading rooms, for the purpose of research or study, during the past year, amounts to 67,542, being 1,674 less than in the year before. The number of visits by artists and students to the galleries of sculpture, for the purposes of study, amounts to 6,354, being an increase of 1,513 to the previous year. The number of visits made to the print room, in 1840, amounted to 6,717. The total number of additions to the zoological department, by purchase or otherwise, 21,976 specimens.—*Report, House of Commons,* March 8, 1841.

Waterproof Boots and Shoes.—The leather is made waterproof by applying to one or both sides, according to the part of the shoe for which it is required, a solution of caoutchouc in turpentine and linseed oil. The upper leather is lined to any required height with chamois leather, coated on one side with the solution, and is sewed, together with its lining, to the welt and inside sole. The under side of this sole, the welt and the stitches, are then saturated with the solution, and a middle sole, coated on both sides, is put on in lieu of the *offal* or filling of refuse leather which is usually employed. The whole is then covered with the under sole, coated on the inside. The above improvement in the solution of caoutchouc for waterproofing boots and shoes was communicated to the Society of Arts, London, by Mr. Wm. Key, 111, London Wall, on the 12th of March, 1840.—*Trans. Soc. Arts,* 1841.

Coal Dust as Manure.—Mr. W. H. B. Webster, Surgeon, R. N., of Ipswich, has paid some attention to this subject, the details of which may be found in the last part of the Transactions of the Society of Arts, London. The analogy between the constituent principles of coal to that of oily matter led Mr. W. to conceive that it might be advantageously employed as food for plants. The complete insolubility of coal dust seems to be the inseparable objection to its utility as a manure, and Mr. W. is inclined to believe, from a long continued series of observations, that the slender filamentous radicles of plants (in other words *spongeoles*) have a power in all respects equal, if not superior, to small electro-galvanic wires of low intensity, which by slow continued action decompose most substances that are presented to them, and among others that of *coal dust.* Mr. W. also further states, that, whatever the vital principle may be, a lower grade cannot be assigned for it in the scale than that of electro-galvanic influence; and we are not, says he, assuming too much for the vital action of the radicles, when we claim for them a power equal to that of small galvanic wires, which can and do effect a decomposition of coal dust. He then proceeds to demonstrate the fact, that coal dust is *not inimical* to vegetation, and this he accomplishes, by filling a series of garden pots with fine coal dust, and planting and sowing a variety of plants therein, as potatoes, onions, &c. In all of them the vegetation was extremely vigorous and luxuriant. He also filled hyacinth glasses with coal dust, and put bulbs therein, supplying water as required; and the result, when compared with those without the coal dust, was very marked and evident; large, healthy, strong plants being produced, and admired by many.——[It may be questioned whether the coal dust as above stated performs any other part in the economy of the vegetables than that of allowing the roots or *fibrillæ* to develope to a much greater extent, and consequently to imbibe a larger proportion of moisture, and thus cause increased development. We are inclined to believe that any loose material, especially if it has with it saline substances, as is most probably the case with coal dust, would answer the purpose equally well.]

VARIETIES.

Fire at the Southampton Railway Terminus.—The workshops and storehouses connected with the locomotive department of the Southampton railway at Vauxhall, were destroyed by fire on Monday night. The total damage sustained is estimated at £20,000, of which £8,000 was the value of machinery in the locomotive workshops.

The Falls of Niagara.—The reported destruction of the falls of Niagara which we last week noticed, is supposed to be a hoax, as the account is not confirmed by subsequent arrivals from North America.

Rangeley's Rotation Railway.—We are glad to learn that a company has been formed for the purpose of putting the principle of this ingenious invention into practical operation. The safety of the system is undeniable; the only questions to be determined, are expense and wear and tear. It appears to us, that if the rails fixed to the carriage were to be prolonged beyond the carriage itself, so as to extend the points of bearing, there might be a considerable saving effected in the number of requisite wheels, and also a saving of power.

Fraud on a Railway Company.—At the Leicester adjourned sessions, Thomas Richards was convicted of an attempt to defraud the Midland Counties Railway Company of £225, by insuring a parcel purporting to contain that sum, which, upon being opened, was found to be composed of waste paper. He was sentenced to six months' imprisonment with hard labor.—*Derby Reporter.*

Liability of Mine Owners.—At Stafford Assizes on Saturday, a case was tried to determine the right of "hutty" colliers to recover the value of the gate-roading, airheading, and engine belonging to the same, when they discontinue to work the mine. These works, which were necessary for carrying on the colliery, had been construeted by the plaintiffs in the case, and it was attempted to put off payment by contending that the owner of the mine is not liable for the value of those works, but that those who sueceeded the plaintiffs in working the mines were responsible. The jury, however, decided in favor of the plaintiffs, by giving them the full amount claimed, viz., £149 17s.

An American Shaver.—A correspondent of the *Montpelier Patriot* (American paper) states that a Mr. John Demerett, cutler, of that town, has made a jack-knife for himself, which he uses to cut ebony, whalebone, horn, and at the same time makes his pens, and shaves himself with it, without grinding or honing.

Railway to Lake Erie.—In the public works of the state of New York two plans are in operation at the same time, the use of which, in conjunction with each other, some of the journalists say, it is difficult to reconcile. On the one hand there is a plan to enlarge the Erie Canal at a great expense, and on the other a plan for an Erie railroad, which, it is thought, would render the canal in a great measure unnecessary. The Legislature encourages both enterprises with money, and this adoption of two plans for the same object is compared in some of the papers to Sir Isaac Newton's well-known expedient of making a large hole for the cat and a small one for the kitten.

Inquiry into Banks of Issue.—We have been informed that the committee on banks of issue have concluded their examinations of witnesses regarding the private banks in England. On Friday it is understood that Mr. Gilbart will attend the committee as representing the English joint-stock interests, and after that class of banks is exhausted, the committee will direct their attention to the Irish and Scotch establishments.—*Times.*

Attempted Escape of a Prisoner from a Railway Carriage.—On Monday last, as a police-officer was taking prisoners from Halifax to Wakefield House of Correction, in the Manchester and Leeds Railway carriages, one of them, committed for housebreaking, asked to have his handcuffs taken off, as he was in great pain from the pressure on his wrists. The request was, from kind feeling, no douht, complied with; and the man no sooner felt himself liberated, than he leaped out of the carriage, although the train was going at full speed. An alarm was given, the engine was stopped and put back, and the poor wretch was found with his skull fractured and both his legs broken. He was taken up into the train again, and conveyed from the railway station on a board to the House of Correction.—*Leeds Mercury.*

Gold, Silver, and Copper Coin.—The following is the number of pieces of various sorts coined at the Mint from the 1st January, 1837, to the 31st of December, 1840:—Sovereigns, 4,395,373; half-sovereigns, 434,778; crowns, *nil;* half-crowns, 567,072; shillings, 9,741,600; sixpences, 7,524,000; fourpences, 6,070,680 (the total number of fourpences issued being 10,325,320); pence, 174,720; halfpence, 1,075,200; and farthings, 10,913,280.

Explosion of a Boiler.—On Friday morning, the 26th ult., as the men of Messrs. Roberts's Hibernia Foundry, in Mountmellick, were proceeding to their work, the boiler of a high pressure engine exploded, and so severely scalded and injured two men, that they expired within a few hours. One of them was driven with great violence to a distance of several yards, and received a fracture of the skull; the other fell into the ash-pit, and was literally scalded to death.—*Leinster Express.*

Transatlantic Steamers of the United States.—The proposition now before the Government from New York is to build four steamers of 2,500 tons each, to run between New York and Liverpool, and in case of war the Government to buy the steamers at a valuation agreed upon by both parties. The vessels are to be built in all respects as men-of-war, and to carry 1,500 to 2,000 tons freight, with 200 passengers, and intend to burn anthracite coal. The capital to be employed is *two millions* of dollars. If the Government accede to the proposition, two of the steamers, it is said, will be ready in May, 1842—the other two the following year; the two first to run monthly, and, when the others are completed, to run twice a month, except three months in winter, when they will run only once.—*New York Express.*

Change Produced by Railways.—Some years ago it was no uncommon thing for the principal inn in Doncaster to have nearly thirty pair of horses engaged in posting to York Assizes on the Sunday previous to their commencement. On Sunday week, heing the day before the opening of the present assizes, only one pair was reqnired from the first posting house in that town. The rails have thus almost destroyed the business of the Great North Road.—*Sheffield Iris.*

Gas-lighting, London.—For lighting London and its suburbs with gas there are eighteen public gas-works; twelve public gas-work companies; £2,800,000 capital employed in works, pipes, tanks, gas-holders, apparatus; £450,000 yearly revenue derived; 180,000 tons of coals used in the year for making gas; 1,400,000,000 cubic feet of gas made in the year; 134,300 private burners supplied; 30,400 public or street consumers; about 2,650 of these are in the city of London; 380 lamplighters employed; 176 gas holders, several of them are double ones, capable of storing 5,500,000 cubic feet; 890 tons of coals used in the retorts, in the shortest day, in twenty-four hours; 7,120,000 cubic feet of gas used in the longest night, say 24th of December; ahout 2,500 persons employed in the metropolis alone in this branch of manufacture; between 1822 and 1827 the consumption was nearly doubled; and between 1827 and 1837 it was again nearly doubled.

Ship Struck by Lightning.—The barque Catherine Elizabeth was struck by lightning on the 31st of December, when in latitude 31.37 N., longitude 24.27 W. The main royal mast and the top gallant mast were knocked to pieces. The lightning passed down the chain scuttle, and set fire to the medicine chest.

The City Improvements.—The workmen are now removing the large mound of earth upon which the merchants used to assemble in the Royal Exchange, and which, according to the original estimate, the committee intended to retain, and vaults are to be constructed under the whole of the building. These vaults will be secured with iron doors, and every provision against fire. Already several of these iron vaults have been taken by merchants as depositories for their securities, books, and documents of various kinds. Mr. Webb, the contractor for the building, has commenced the erection of the Sun Fire-office, in Bartholomew-lane. It will he a huilding corresponding with the magnificent pile which will soon begin to show itself. The contract amounts to from £18,000 to £19,000. The Argus Assurance Company's Office and the two adjoining houses are to be put back, so as to form a direct line with the London and Westminster Bank in Lothbury, so that the thoroughfare leading to Cateaton-street will be considerably widened. Already a number of houses in the narrowest part of Cateaton-street have been levelled, and the workmen are now pulling down the large premises of Messrs. Davis, Barber, and Howse, at the corner of Guildhall yard.

ADVERTISEMENTS.

LAW OF PATENTS.

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WEBSTER'S (Thomas) Law and Practice of Letters Patent, for Inventions, Statutes, Practical Forms, and Digest of Reported Cases, 9s.

SCIENTIFIC PERIODICALS.

Art-Union.	Magazine of Science.
Athenæum.	Mechanics' Magazine.
Chemist.	Mirror.
Chambers' Information for the People.	Mining Journal.
Civil Engineer and Architect's Journal.	People's Magazine.
Gardeners' Gazette.	Philosophical Magazine.
Glenny's Gardeners' Gazette.	Polytechnic Journal.
Gardeners' Chronicle.	Provincial Medical and Surgical Journal.
Gentleman's Magazine.	Railway Magazine.
Lancet.	Railway Times.
Law Magazine (Monthly).	Railroad Quarterly Journal.
Legal Observer.	Repertory of Arts.
Literary Gazette.	Spectator.
London Journal of Arts.	Smallwood's Magazine.

ACTS OF PARLIAMENT.

PATTERNS,—
27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17. (The last relates to patterns and *models.*)

PATENTS FOR INVENTIONS,—
2 and 3 Victoria, c. 67.

SCULPTURES,—
38 Geo. III., c. 71.

ENGRAVINGS,—
7 Geo. III., c., 38; 17 Geo. III., c. 57.

COPYRIGHT,—
8 Anne, c. 19: 12 Geo. II., (Booksellers' Act), c. 36; 15 Geo. III. (Universities' Act), c. 53; 54 Geo. III. (General Copyright), c. 156.

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CRAIG'S ROTARY STEAM-ENGINE.

We noticed in a recent number a rotary steam-engine which acts on the same principle as Barker's mill—steam being substituted for water. We were not aware at the time of the name of the patentee of this simple adaptation of the impulsive force of steam in producing rotary motion, but we have since received a publication descriptive of the engine, in which Mr. Craig's claim to the honor of the invention is set forth. We are glad he has adopted this method of making his ingenious application of steam power more generally known, for we feel convinced that the principle on which this mode of applying steam in producing direct rotary motion depends, is the most efficacious that can be adopted, and is calculated greatly to extend the employment of that moving power.

We are, however, far from supposing that the manner in which the principle is applied in Mr. Craig's engine approaches to perfection, whatever its merits may be compared with the piston engine. It is, we feel persuaded, capable of great improvements; but before any important advance can be made towards perfection, it is necessary that the principle of its action should be well understood. This is the more essential, as it appears to us that in the publication describing the engine, and explaining the mode of its action, erroneous views have been taken of the manner in which the machine operates. In our former notice of this engine we stated that the rotary motion was produced by the re-action of the air and of the sides of the surrounding case, on the jets of steam issuing from the ends of the hollow shafts, in a direction contrary to the line of motion. In the authorised description of the engine, the writer expressly says, that the motion of the engine is entirely independent of re-action against any resisting medium. This is a point which it therefore becomes necessary to determine in the first instance, as a necessary preliminary to further improvement.

It must be confessed that the writer of the account of Mr. Craig's engine, though he denies the effect of re-action, seems to consider the nature of the agency involved in doubt. In one place, it is asserted that the motion is produced solely by "a disturbance of the equilibrium" of the steam pressure in the hollow arms by the apertures of the nozzles, and in another, electrical agency is hinted at. The words of the author are, "the principle, then, upon which motion and power are communicated to the arm is not by *re-action against any resisting medium, but by the taking off of pressure on one side of the arm, by which its equilibrium is destroyed to that extent, and by which a pressure is communicated to it in the opposite direction, equivalent to the pressure so taken off, whatever that may be.*" We object to this explanation, that it throws no light on the phenomenon. There are few practices more prejudicial to the investigation of truth than that of making some well-accredited and big sounding terms serve the place of intelligible explanations. "Equilibrium," is a term much used by some writers on mechanics, and all the actions of different forces are made by them to depend on the disturbance of equilibrium; but this mode of explanation does not advance one step further towards an explanation of causes, while it tends to mystify the subject, and to stop further inquiry. Motion, it is true, is generally produced when the equilibrium of opposing forces is disturbed, but the disturbance of the equilibrium is an *effect* and not a *cause;* the cause of motion is the force then brought into action. To say that force is "of course," communicated in the opposite direction when the equilibrium is destroyed, is entirely begging the question, for the manner in which the liberated force operates is the point to be considered.

It is a generally-admitted principle in dynamics that re-action is always a necessary accompaniment of action; and that the two forces are equal to each other, and in opposite directions. When, therefore, any facts present themselves which appear to invalidate this generally-accepted law of motion, we should rather doubt the correctness of our observation, than advance it in opposition to that established rule. The fact on which the expositor of Mr. Craig's engine depends for his positive assertion that the motion is not communicated by re-action is, that the arms work with greater power in vacuo than when acting against the resistance of the atmosphere.

In the first place, we cannot agree that there is no resistance to a jet of steam rushing into a vacuum. If the issuing steam met with no resistance, it would flash out instantaneously; but the fact will be found to be, that the first particles of steam, or other fluid, that issue from an aperture in vacuo present a resistance to those which succeed, and as the steam rushes with greater velocity into a vacuum than into the atmosphere, a corresponding re-action is produced by the increased volume of steam forced out. But, putting aside this consideration, there is, in the engine in question, a firm re-acting resistance in the surrounding case itself, which, whether the arms are moving in vacuo or against the pressure of the atmosphere, at all times affords a resisting point of re-action.

The external case, though it is not mentioned in the published description as performing any part in the action of the engine, but is merely considered as a convenient adjunct to confine the escaping steam, nevertheless, in our opinion, adds greatly to the working effect. One of the purposes this case serves, which we have just noticed, is, that it presents a firm re-acting surface against the issuing steam at every point. But it also answers another and still more important object; it confines the heat, and thus prevents the steam from becoming condensed as it issues from the jets. Were the case to be closed, and made to act as a condenser, we conceive that the effect of the engine would be almost destroyed. The steam would rush out more rapidly, but its impulsive effect would be annihilated as soon as condensed, and if the condensation took place the instant it issued from the nozzle, there would not, as we contend, be any action whatever. If this could be experimentally proved it would afford a conclusive argument against the disturbance-of-equilibrium theory; for in that case the disturbance of the equilibrium would be increased though the motion were destroyed. If the arms were to revolve without being protected from the air, a similar effect, though in a minor degree, would be the result, and in proportion to the extent of condensation would the working power be diminished.

To enable a rotary steam-engine which depends on the impulsive action of steam to work with full effect, care must be taken to prevent condensation before the impulsive force is expended. It is the want of attention to this circumstance that has, we believe, caused the failure of many of the rotary engines previously contrived; in Mr. Craig's engine this difficulty is overcome by the enclosing case.

It appears, therefore, that rotary engines, in which the impulsive rather that the elastic force of steam is brought into action, cannot apply the

condeusing power of steam advantageously. They must all be actuated by high-pressure steam; neither is there, in Mr. Craig's engine, any means of rendering the expansive force of steam available; it must always be worked at full pressure. In these respects, therefore, this engine is defective, as it can never obtain from a given volume of steam its total working capabilities. Some time previous to our knowledge of Mr. Craig's application of the principle of Barker's mill to steam power, the idea suggested itself of a mode of applying steam in a manner somewhat similar, in which its condensing and expansive principles of action might be combined with its impulsive force. We do not feel at liberty to explain this mode of application at present; we merely mention it, to show that the opinion, before expressed, that Mr. Craig's engine is but a first step in the course of a great improvement, rests on a previous consideration of the subject, and to point out the nature of the defects which now attend its action.

FELTED CLOTH MANUFACTURE IN BELGIUM.

The *Fanal*, which has frequently noticed the manufacture of felted cloth, to the invention of which it lays claim for Belgium, gives, in a recent number, the following account of the mode of manufacture in the Phœnix establishment at Ghent. It appears from this article that the Belgian process is in some respects an improvement on that carried on so extensively in this country; but national prejudice tinctures these accounts so strongly that all claims to superiority become very questionable.

"If Belgium has not the honor of ranking at the head of manufacturing nations, she may at least be placed next to England. Of all countries on the Continent Belgium was the first to introduce the spinning of cotton, to manufacture gas used for lighting, to construct railroads, &c. She will have the additional honor of introducing felted cloth, a discovery of the greatest importance, the full extent to which it may be applicable not yet being known. We were present at the manufacture of the first piece, and witnessed the realisation of one of the hundred and one Utopian schemes that we are falsely reproached with grasping at too eagerly, and which sooner or later will bear their fruits.

"Twelve years ago we announced our anticipations of the possibility of replacing the spinning and weaving of woollen by simply felting it. The problem is now solved; and in order to give an idea of the saving of expense resulting from it, it will be sufficient to state that the manual labor in the manufacture of this cloth costs scarcely so much as the price of the oil employed in the preparation of the other.

"We have come from the Phœnix manufactory, where the first machines are working, and will continue to work for the benefit of the public instruction in the art, to the end of this month. When the process has been witnessed, prejudice, doubts, and petty jealousies will be obliged to yield to such an accumulation of evidence. No further credit will then be paid to those who affirm that they can put their finger through this cloth, that it is not strong, that it can be stretched and contracted, and that the indentations made in it by the knees and elbows form bags which cannot be removed, &c. A hundred other objections are added to these, emanating from a spirit of detraction, the usual attendant on new inventions, and which only tends to add to their triumph.

"M. de Bast-de Herdt may aspire to the glory of Lievin Bauwens,—the one has effected in cloth that which the other has effected in cottons; they have equally a claim to the dislike of the English and to the gratitude of Belgians.

"It is known that the first manufacture of felted cloth was carried on at Leeds, only a very few months before the director of the Phœnix manufactory conceived the design of introducing it into Belgium. This is now done, and many capitalists have already ordered machines from this establishment, where they are so well executed. At present we shall confine ourselves to endeavoring to give an account of the manufacture of felted cloth.

"The first piece of machinery consists of a coarse carding machine, which is succeeded by a finer one to produce what is termed the nap. Two workmen spread wool as evenly as possible upon a circular hurdle, which brings it in contact with the teeth of the cylinders.

"This wool, pulled to pieces, divided and picked, is conveyed in equal quantities from cylinder to cylinder, till it reaches the last carding machine, whence the comb detaches a continuous sheet as fine and transparent as a spider's web.

"The sheet is placed under two other large cylinders covered with an endless cloth, which carry back this first nap by twisting it backwards and forwards in zig zags, and which are sufficiently numerous and placed at sufficient distances to form a piece of cloth, extending from the point where it was detached: and whence it becomes doubled by a second sheet, then with a third, and so on till it reaches twenty, thirty, or forty, according to the thickness the cloth is required. This machine is not English; it was invented by M. Windsor, the skilful director of the Phœnix establishment. It is very ingenious.

"The cloth having acquired the requisite thickness, and being rendered very even by the superposition of a great number of sheets, is wound round a roller, which is taken to the felting machine.

"This machine is composed of a large table covered with an endless cloth, on which is placed thirty iron cylinders covered with cloth, and all impelled by a slight backward and forward motion lengthways, and by a very slow rotary motion.

"The cloth submitted to this course of mechanical felting is continually exposed to jets of steam, which, more than any other agent, assists in disposing wool to felt by twisting the small particles into spiral hooks, which intermix with each other as though they were momentarily endowed with that vermicular action which is the property of all felting substances.

"The piece passed on to and rolled over another drum, is taken to the machine for finishing and giving firmness to the material. This substance placed between two cloths, is exposed to the action of thirty cast-iron rollers, which are this time impelled by a motion from the right and left, produced by mechanical contrivance, quite on a new principle; and which struck us as resembling the pilgrims of *Echternach*, who make two steps forwards and one backwards. During this time the cloth is moistened with soap suds and jets of steam.

"When taken from this apparatus the cloth may be considered finished, with the exception of the combing, shearing, dying, and dressing, which is performed in the same manner as on the usual kind of cloths.

"The resources presented by this new method of manufacturing are inexhaustible; by this means cloth can be made with coarse wool on one side and fine on the other, or fine on both sides and coarse in the middle.

"Cloths may also be manufactured of two different colors, the wool being dyed one color for the front, and another for the back, which will be very suitable in Japan and China, where variegated cloths are much valued. Carpets may be manufactured of the thickness of the hand or thicker; the hair of cows can be used, or floss silk; and probably they will attain the method of mixing various vegetable substances with the wool; perhaps even sea-weed may be felted for door mats. But at all events the Phœnix establishment is in possession of a mode of manufacture unknown to the English, and which will eventually enable them to manufacture very fine cloths of very thin texture, and yet quite as strong as the finest woven cloths. We do not wish to say more on this point at present, till experiments of this new improvement have been made."

MANUFACTURES OF BELGIUM.

(*From the Journal of Commerce.*)

Of the many important truths which have been gradually making their way during the last twenty-five years respecting the elements which contribute to the rise, progress, and permanence of manufacturing superiority, there is hardly one which is not strikingly illustrated and confirmed by the present condition of the manufactures of Belgium. In the first place it may be remarked, that under the system of Napoleon, nothing which his decisive, but in commercial matters mistaken, policy, could achieve for their support and encouragement, was left unattempted; and that when Belgium, at the great settlement of Europe, was incorporated with Holland, the same policy for her advancement continued to be pursued with even additional vigor. In whatever branch of manufacture capital was deficient, the state or the monarch liberally supplied it; whatever branch suffered the pressure of a temporary glut, the state relieved it either indirectly by bounties upon expertation, or directly by buying up the surplus goods, and exporting them itself at a loss; and in this liberal but injudicious spirit no means were spared to protect the manufacturing enterprise and industry of Belgium even from a momentary check. While Belgium retained a preference in the markets of Holland and her colonial dependencies, there was a stimulated demand for, at the same time that there was a stimulated supply of, her productions, and the two errors concealed, if they did not compensate for, the effects of each other; but the instant that a separation took place, and the manufactures of Belgium were destined to stand or fall by the intrinsic soundness of the principles upon which they had been based, the rottenness of the system became manifest. It was then made clear that the well-intended patronage of the King of Holland had done the manufactures of Belgium harm instead of good; that its tendency had been rather to supersede than to assist individual enterprise; and another proof was accumulated to what the enlightened few had long argued for as a universal truth—that no fiscal protection or bounty can confer ultimate benefit upon manufactures. The true source of their permanent prosperity lies in their creating it for themselves.

The prosperity of Belgium was created artificially—for all legislation to assist the growth of manufactures, is but the injudicious artifice of rearing a young giant in leading strings; and the moment the artificial aid was withdrawn, her progress was arrested. Her export of cotton goods in the first six years of her new position declined 60 per cent.; her export of woollen goods in the first eight years, nearly 80 per cent.; and her silk trade may be said to have become extinct. There are now only three branches of manufacture which she retains to any extent—the linen manufacture, the manufacture of machinery, and sugar refining; and for the two latter, she is solely indebted to our folly in pertinaciously clinging to the same false notion of encouraging domestic and colonial industry, by state interference, which engendered the instability of her cotton and woollen manufactures. We shall endeavor briefly to describe the present condition and prospects of the three branches of manufacture in Belgium, which we have above specified, acknowledging our obligation for facts to a work on Belgium, full of valuable statistical information, just published by Mr. Emerson Tennent, M.P.

With respect to machinery it should be observed, that from the time that Napoleon originated

the idea of reinstating the Low Countries in the position of manufacturing pre-eminence which they enjoyed in an earlier age, the great obstacle to its being successfully carried out was the want of that machinery which had long given England so great an advantage. Our laws were prohibitory against its exportation, and we vainly supposed that we could also prohibit the exportation of the knowledge required for its construction. We left the Belgians no other alternative but manufacturing machinery for themselves; and the value of the object to them necessarily created a premium for the artist to escape with his skill, and for the smuggler to carry off models, and machinery itself, by piece-meal, which no laws could morally discountenance, and no preventive force could physically render inoperative. When our Government were convinced that they had been pursuing a fruitless contest, they did not abandon it; they only relaxed it, allowing the exportation of machinery up to certain dimensions, and of tools, which are themselves machines for elaborating the various parts of machinery for manufactures. They still imagined that we could keep the most powerful class of machinery to ourselves. The result is seen in the Phœnix Iron Works, at Ghent, and in those at Seraing, which, contrasted with the largest iron works in this country, Mr. Tennent compares as "a mammoth to a mole-hill." The immense trade carried on in such places, where they now manufacture all sorts of machinery for spinning flax, cotton, silk, and wool, to supply every part of Europe to which they have convenient access, we have forced upon our continental neighbours, in a vain war with the freedom of commerce, to protect our manufacturers from competition; and experience has surely at last taught us that every such war must be equally a losing one in the end.

In the refining of sugar the Belgians do a considerable trade, possessing between sixty and seventy refineries, and exporting largely to Germany, and by way of the Mediterranean. It seems, however, very improbable that they could retain this trade against British competition, did they not possess the great advantage over us of their commerce in sugar being perfectly free. Wherever they can get the article they want at the cheapest rate, they are permitted to do so; while the English refiner is shut out from a foreign supply by duties upon it, to protect the growth of our own colonics as a recompence for the restrictions we impose upon them. If a general measure of commercial reform were devised which would admit such a reduction of the duty upon foreign sugar as would bring it within the reach of the British refiner, Belgian refining would be reduced to a very critical situation.

The most important article, however, of Belgian manufacture is the linen. Their ability to enter into competition with us, either in the sale of yarn or cloth, depends upon the advantage they at present possess of being the growers of the best flax in the world, Belgian flax, on the average, ranging in value above British in somewhere about the proportion of 17 to 10. The Belgian Government are wisely very anxious about the retention of this trade; but they do not evince much wisdom in the mode they have conceived for effecting it. If they profited by our experience in attempting to keep the manufacture of machinery to ourselves, they would adopt any course rather than the one they seem inclined to.

The Belgian Government, alarmed at the comparative rapidity of our progress, seem to have adopted the notion that their own manufacturers must be protected by raising, through the intervention of duties, the cost of the staple to the British and Irish manufacturer — an experiment which would infallibly end in Belgium losing the monopoly of the staple. If this country could not keep manufacturing machinery from Belgium, Belgium is not likely to keep from this country an object of so much easier attainment as flax. She will only drive us to grow our own flax, by the same jealous and inefficacious policy as we drove her to make her own machinery.

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COPYRIGHT IN DESIGNS.

(*From the Times, March* 24.)

On going into committee to-day on Mr. Emerson Tennent's bill for Extending the Copyright in Designs for printed articles, Sir Robert Peel has given notice of a motion to substitute an effectual copyright of nine months for the delusive and inadequate one of three months which at present exists. The law upon this subject presents an anomalous appearance in England, not only as compared with France and other manufacturing countries, but also in reference to the different branches of production in this country into which art and design enter as an element in their manufacture. In France an artist who devotes himself to the production of embellishments for articles of manufacture of any description, textile, modelled, or metallic, can have a copyright securing to him their exclusive use for almost any period, on paying a franc for each year of protection claimed, be it three, five, or ten; and ten francs for their absolute property for life. Under the influence of such a law, art, as applied to manufactures in France, has attained a proverbial eminence, and the taste and elegance of its productions are confessedly the first in Europe. In Great Britain, down till a very recent period, there was a copyright of but three months for the great majority of British productions to which design is applied. A large number, such as silks, woollens, and metals, had no protection whatsoever, and glass and some other articles are still destitute of any protection for the ornaments or configuration. In Ireland there was no law at all regarding it till Mr. P. Thomson, in 1839, succeeded in passing two acts upon the subject, and extended their provisions to that country. By those acts a protection of three years is given to metals and some other substances, and twelve months to designs, when *woven* into any fabric. But the old term of three months was continued unaltered to printed designs, such as are applied to cotton and calicoes, as well as to the finer productions in silk and wool. In other words, the benefits conferred upon less important branches of trade were withheld from that which is now the grand staple of England. Silks, of which (comparatively speaking) the production is small, ob-

tained a twelvemonth's protection, whilst nothing whatever was done for the relief of printed calicoes, the production of which amounts annually to 15,000,000 pieces, or somewhere about *five hundred and twenty millions of yards.* * * *

But it is not the contradictions and inconsistencies of the law that called for its amendment, so much as the positive injury which it has been inflicting on the most important branch of our industry. The three months' copyright has been found to be a mere delusion, so far as regards any actual protection to the inventor or the publisher, whose designs and patterns have been pirated and copied in spite of it to an extent that would hardly be credited; and this, too, by individuals whose high station and wealth would have been supposed to be a security against their engaging in such practices. * * * *

The ruinous effects of this system upon the fair trader are obvious. The pirate who seizes, without any cost or expense, upon what has cost the honest producer much time, labour, and outlay, can, of course, undersell him in the same proportion; and parties knowing that the copies are likely to follow the appearance of the successful original with ruinous rapidity, are actually deterred from purchasing freely from the honest trader, lest they might be overtaken and undersold by the copyist before they could dispose of their stocks. The whole economy of the trade is thus thrown into alarm and confusion, and the property of the ingenious and honorable producer is deteriorated or ruined by the unchecked depredations of his ever-wakeful persecutor, the pirate; and this chiefly because the term of copyright is so short that it is not worth his while to resort to law proceedings to vindicate his violated rights. A pattern after its appearance requires a few weeks to test its favor with the public,—in other words, to mark it out for the fangs of the pirate; a few weeks more elapse before he can surreptitiously reproduce it; and perhaps a few more before he is detected; and then, if the injured owner resorts to the law for redress, his copyright of three months will have actually expired before he can obtain it. Under these circumstances his prudent course is to submit unresistingly, and to look upon the first loss as the least one.

But look to the effects of this lawless system upon the state of the trade itself, and upon the progress of the arts as applied to it. Its first and most obvious effect is to stifle all efforts at the introduction of superior elegance or advanced refinement. No man will or can afford to keep designers for the use of his own rivals and competitors. No man will go to unusual expense to produce a pattern for the benefit of the pirate rather than himself. Designers of the most ordinary merit are therefore preferred, because their earnings are small, and there is less risk in employing them; whilst the productions of high talent are rejected because requiring greater cost to produce them. Mr. Applegath, an eminent printer and a man of great genius, stated to the committee of last session, that although on one occasion he was offered designs by Mr. Sydney Smirke, the architect, for printing decorations for rooms in a style hitherto unattempted in this country, and on another by Sir David Wilkie, for producing hangings in imitation of the Italian interiors, he was obliged to decline the assistance of both, because the cost of production would have been great, and, as the copyright was so short, the pirate would lay hold on them, and appropriate the profit before he could possibly have been remunerated for the outlay.

To remedy this disgraceful state of the law, Mr. Emerson Tennent has introduced a bill to extend the copyright from three months to twelve; in other words, to place the designs for printed fabrics and calicoes on the same footing of protection as those for woven designs and silks. This measure has been vigorously opposed; but, as might be anticipated, its only opponents are the *pirates* and their friends. * * * *

The grand argument against the extension of the term at all is, that although for six months or twelve months you may tie up the impatient hands of the English pirate, you cannot in the meantime impose a similar restraint upon the calico-printer in France or elsewhere abroad, and that he will copy the successful English patterns and meet us in neutral markets with imitations of them—a course which he is now deterred from (*they say*) by the knowledge that the English pirate can himself achieve the larceny, and have out his copies almost as soon as the foreigners. Now, apart from the immorality of justifying a theft by one party on the ground that if he did not do it another would, this whole argument is based upon three distinct assumptions, no one of which is tenable.

First, the French copyist will not imitate an English pattern unless it is *better* than his own; but it is notorious that the English patterns are infinitely *worse* than his own; and why should he condescend to meddle with them? *Secondly*, he will not touch them, even if superior in execution, unless he is assured that they are of a style and fashion such as will sell in preference to his own. But it is well known that the English taste in these matters is so *lourd* and heavy, that an English pattern in anything is unsaleable upon the continent in competition with a foreign one, German or French. But, *thirdly*, the foreigner cannot copy an English pattern unless he can produce it *cheaper* than the English printer, and this, it is well known, owing to our local advantage in machinery, skilled labor, fuel, and command of markets, the foreigner cannot do by at least 50 per cent. If, then, our designs are worse than his own, unsuitable to the taste of his customers, and cheaper by 50 per cent. than he could afford to offer them, it remains for the opponents of copyright extension to show, and to prove, the inducement which the foreigner would have to take up the abandoned trade of the British pirate.

Totally independent of the equitable claim which the original inventor has to protection for his property and remuneration for his labor, the fact of the copyright being rendered effectual and sufficient will give a fresh impulse to industry, and an increased employment and incentive to artists, by compelling every man to employ designers for his own works, instead of pilfering the productions of his neighbours. It will tend to exalt the character of British productions in markets abroad, where they are now cast into the shade by the superior beauty of the productions of France; and it will complete the system for the education of artists at home, by giving to the pupils of our schools of design a security which they now want for the exercise of their talents, as professional men, when the period of their pupillage shall have expired.

The practical effect of the present system upon the general trade of this country has been, to confine its production exclusively to a medium and low style of goods, devoid of delicacy and refined beauty, but of that homely cast which is thrown off by machinery, and, being sold in vast quantities to our consumers at home and in the colonies, can be offered at the lowest possible rate. In France, on the contrary, schools of design, and an effectual copyright protection for educated designers, have induced talent of the highest order to embark in the preparation of patterns and models for manufactures. The consequence is, that the articles of the French school, though much higher in price, find a ready market amongst the higher classes in every country of the world, whilst the low-priced goods of England are confined only to the middle classes. Mr. Emerson Tennent contends, that by rendering the copyright effectual, a protection will be given to artists similar to that in France, and that, finally, it will encourage the development of equal beauty in the productions of England; thus, in addition to our present unrivalled *cheapness* of production, which secures for us the consumption of the middle classes, securing to us also that superiority in beauty which is now the province of the French alone, but which would then enable us to contest with them the supply of the wealthy and the rich.

On Wednesday evening, when Mr. Emerson Tennent's motion for going into committee on the Copyright in Designs Bill was proposed, it was suggested by Mr. Labouchere, the President of the Board of Trade, that it would be better to defer the further stages of the bill until it was reprinted, with the alterations that had been made in it. Mr. Hume, who has all along opposed the extension of copyright, objected to the proposed alterations as altogether informal. He said, leave had been given to bring in a bill relative to the copyright of designs for woven fabrics and paper hangings; but the bill embraced articles of various kinds—glass, metals, carpets, shawls, and so many other things, that there was not a manufacture in the kingdom that would be free from its operation. All these interests had necessarily been taken by surprise, and under these circumstances he submitted that a bill the body of which contained matter foreign from the preamble was irregularly framed, and could not be permitted to proceed consistently with the rules of the house. Mr. Tennent was unwilling to postpone the progress of the bill, and contended that the proposed alterations could be discussed in committee without the necessity of recommencing. He mentioned some facts to prove that the opposition to the bill arose merely from a few printing establishments in Manchester, which town was the only one where patterns were pirated. Out of 179 calico-printing establishments in the United Kingdom, only 36 were against the measure of additional protection, and those 36 were confined to Manchester. Mr. Tennent urged that it was useless to encourage schools of design unless protection to designers was granted, for at present the taste of the public was in advance of the English manufacturers, owing to the want of encouragement which the designers experienced. After some discussion it was finally agreed to postpone the committee, with a view to originate a new bill in which all the additional objects to which copyright is proposed to be extended should be included.—On Thursday evening Mr. Tennent obtained leave to bring in the new bill.

PATENTS.—BRITISH AND FOREIGN.

MONTHLY LIST OF NEW PATENTS.

George England, of Westbury, Wiltshire, clothier, for *improvements in machinery for weaving woollen cloth and other fabrics and for twisting, spooling, and warping woollen, also for improvements in the manufacture of woollen doeskins.*—6 months, March 2.

John Wilkie, of Nassau-street, Marylebone, upholsterer, and John Charles Schwieso, of George-street, St. Pancras, musical instrument maker, for *improvements in constructing elastic seats or surfaces of furniture.*—6 months, March 2.

Henry Newson Brewer, of Jamaica-row, Bermondsey, mast and block maker, for *an improvement or improvements in wooden blocks, for ships, rigging, tackles and other purposes where pulleys are used.*—6 months, March 3.

John Rand, of Howland-street, gent., for *certain improvements in machinery for the manufacture of framework-knitting, commonly called hosiery, and for certain improvements in such framework-knitting or hosiery.*—6 months, March 6.

Thomas Spencer, of Liverpool, carver and gilder, for *an improvement or improvements in the manufacture of picture and other frames and cornices, applicable also to other useful and decorative purposes.*—6 months, March 8.

James Johnson, of Glasgow, gent., for *certain improvements in machinery for the manufacture of framework-knitting, commonly called hosiery, and for*

certain improvements in such framework-knitting or hosiery.—6 months, March 8.

John William Neale, of William-street, Kennington, engineer, and Jacque Edouard Duyck, of Swan-street, Old Kent-road, commission agent, for *certain improvements in the manufacture of vinegar, and in the apparatus employed therein.*—6 months, March 8.

John Varley, of Bayswater-terrace, Bayswater, artist, for *an improvement in carriages.*—6 months, March 8.

Benjamin Smith, of Stoke-prior, Worcester, butcher, for *an improved apparatus for making salt from brine.*—6 months, March 8.

John Walker, of Crooked-lane, King William-street, builder, for *an improved hydraulic apparatus.*—6 months, March 8.

Richard Lawrence Sturtevand, of Church-street, Bethnal-green, soap manufacturer, for *certain improvements in the manufacture of soap.*—6 months, March 8.

Thomas Joseph Ditchburn, of the Orchard-house, Blackwall, ship-builder, for *certain improvements in ship-building, some or all of which are applicable to steam-boats, and boats and vessels of all descriptions.*—6 months, March 8.

Anthony Todd Thomson, of Hinde-street, Manchester-square, doctor of medicine, for *an improved method of manufacturing calomel and corrosive sublimate.*—6 months, March 8.

Stephen Goldner, of West-street, Finsbury-circus, merchant, for *improvements in preserving animal and vegetable substances and liquids.*—6 months, March 8.

John Wertheimer, of West-street, Finsbury-circus, printer, for *improvements in preserving animal and vegetable substances and liquids.*—6 months, being a communication, March 8.

Thomas Clark, professor of chemistry in Marischal College University, Aberdeen, for *a new mode of rendering certain waters (the water of the Thames being among the number) less impure and less hard, for the supply and use of manufactories, villages, towns, and cities.*—6 months, March 8.

John Baptist Fried Wilhelm Heimann, of Ludgate-hill, merchant, for *improvements in the manufacture of ropes and cables.*—6 months, being a communication, March 8.

John Docker, of Galway-street, Saint Luke's, gas-fitter, for *an improvement or improvements on gas burners.*—2 months, March 15.

Richard Laming, of Gower-street, Bedford-square, surgeon, for *improvements in the production of carbonate of ammonia.*—6 months, March 15.

William Newton, of Chancery-lane, civil engineer, for *certain improvements in machinery or apparatus for picking and cleaning cotton and wool.*—6 months, being a communication, March 15.

Robert Warington, of South Lambeth, gent., for *improvements in the operations of tanning.*—6 months, March 16.

Joseph Maudsley, of Lambeth, engineer, for *an improvement in the arrangement and combination of certain parts of steam-engines to be used for steam navigation.*—6 months, March 16.

William Newton, of Chancery-lane, civil engineer, for *improvements in spinning and twisting cotton and other materials capable of being spun and twisted.*—6 months, being a communication, March 16.

George Lowe, of Finsbury-circus, engineer to the Chartered Gas Company, for *improved methods of supplying gas under certain circumstances, and of improving its purity and illuminating power.*—6 months, March 16.

Charles Bunt Dyer, of Pary's Mine, Anglesea, mine agent, for *an improved method of obtaining paints or pigments by the combination of mineral solutions with other substances.*—6 months, March 16.

Lawrence Kortright, esq., of Oak Hall, East Ham, Essex, for *certain improvements in treating and preparing the substance commonly called whalebone, and the fins and such like other parts of whales, and rendering the same fit for various commercial and useful purposes.*—6 months, being a communication, March 17.

William Thompson Clough, of Saint Helen's, Lancaster, alkali manufacturer, for *improvements in the manufacture of the carbonates of soda and potash.*—6 months, March 17.

Henry Augustus Wells, of Regent-street, gent., for *improvements in machinery for driving piles.*—6 months, being a communication, March 17.

Joshua Field, of Lambeth, engineer, for *an improved mode of effecting the operation of connecting and disconnecting from steam-engines the paddle-wheels used for steam navigation.*—6 months, March 22.

Richard Barnes, of Wigan, Lancaster, engineer, for *certain improvements in machinery or apparatus for raising or drawing water or other fluids.*—6 months, March 22.

Anthony Theophilus Merry, of Birmingham, refiner of metals, for *an improved process or processes for obtaining zinc and lead from their respective ores, and for the calcination of other metallic bodies.*—6 months, March 22.

Robert Walter Winfield, of Birmingham, merchant, for *certain improvements in or belonging to metallic bedsteads, a portion of which may be applied to other articles of metallic furniture.*—6 months, March 22.

Robert Goodacre, of Woodthorpe, Leicestershire, for *an improved mode of weighing bodies raised by cranes or other elevating machines.*—6 months, March 22.

David Napier, of Mill-wall, engineer, for *improvements in propelling vessels.*—6 months, March 22.

Achille Elie Joseph Soulas, of George-yard, Lombard-street, merchant, for *improvements in apparatus for regulating the flow of fluids.*—6 months, being a communication, March 22.

William Bucknell, of Westminster, gent., for *improvements in applying heat for the purpose of hatching eggs, which improvements are also applicable to other useful purposes where heat is required.*—6 months, March 22.

Morris West Ruthven, of Rotherham, engineer, for *a new mode of increasing the power of certain media when acted upon by rotary fans, or similar apparatus.*—6 months, March 22.

Robert Cook and Andrew Cunningham, of Johnstone, near Glasgow, engineers, for *improvements in the manufacture of bricks.*—6 months, March 22.

Moses Poole, of Lincoln's-inn, gent., for *improvements in stretching cloths.*—6 months, being a communication, March 22.

Joseph Wright, of Carisbrook, Isle of Wight, mechanic, for *improvements in apparatus used for dragging or skidding wheels' of wheeled carriages.*—6 months, March 22.

Thomas Wright, of Church-lane, Chelsea, Lieut. in Her Majesty's Navy, for *certain improvements applicable to railway and other carriages.*—6 months, March 22.

Edward Finch, of Liverpool, for *improvements in propelling vessels.*—6 months, March 25.

Goldsworthy Gurney, of Bride, Cornwall, esq., for *improvements in the production and diffusion of light.*—6 months, March 25.

ENGLISH EXPIRED PATENT.

Lemuel Wellman Wright, of Upper Kennington-lane, Surrey, engineer, for *improvements in the combination and arrangement of machinery for making metal screws,* March 17.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 182.)

Walter Richardson, of Regent-street, gent. and George Mott Braithwaite, of Manor-house Chelsea, gent., for *improvements in tinning metals,* (communicated by a foreigner,) March 17.—This invention relates to a mode of combining nickel and iron with tin, in order to improve the tinning of metal surfaces.

The proportions of nickel and iron, mixed with the tin, in order to produce the best tinning, are—ten ounces of the best nickel, and seven ounces of sheet iron, to ten pounds of tin.

The temperature at which nickel is fusible being higher than that required to bring tin into a state of fusion, it is necessary to prevent the tin as it melts from evaporating (as it is essential that the two metals be put into the same crucible): this object is attained by adding to ten pounds of the composition one ounce of borax and three ounces of pounded glass; the heat soon causes the borax to bubble up, which augments its volume, and causes it to unite with the melted glass without mixing with the metals. The lightness of these two substances in comparison with the metals, causes them to rise to the surface, where they form a crust, which prevents the action of the air on the metals, the fusion of which proceeds under the influence of a concentrated heat. The fusion is completed in about half an hour, when the composition is run off through a hole in the crust.

In tinning metals with this composition the workman proceeds in the ordinary manner.

Moses Poole, of Lincoln's-inn, gent., for *improvements in preparing materials to facilitate the teaching of writing,* (communicated by a foreigner,) March 17.—These improvements consist in producing printed copies of letters and of hair strokes, by which children are to be taught to trace by the application of typography, and with colored ink, or ink of a pale tint, capable of being passed over again with writing ink; so that the child may re-produce the same lines and letters by passing over them with a pen filled with common ink.

In order to make a complete alphabet, by means of which every word may be formed with perfect regularity, the patentee has employed every means of joining letters; always observing the principles of caligraphy, and giving the preference to the shape of those letters which afford the greatest regularity in the disposition of the different hair strokes; in fact, for every hair stroke that could belong to a letter, the patentee has had a type of the letter cast.

The best method of obtaining clear and pure ink is by dissolving in water the most suitable vegetable or mineral colors. A certain quantity of this liquid is mixed with white lead, till it becomes perfectly colored; the mixture is then dried, and afterwards made use of in the composition of ink by grinding it on a marble slab with oil.

This ink from its peculiar composition impregnates itself into the paper, and as it dries fast renders the writing easy, and possesses such a consistency that none of the particles which compose it detach themselves from the paper, so as to impede the motion of the pen in the hands of the pupil.

William Mill, of Blackfriars-road, Surrey, engineer, for *certain improvements in propellers and steam-engines, and in the method of ascertaining and measuring steam power; parts of which improvements are applicable to other purposes,* March 21.—Claim first.—As regards the improvement in propellers, the patentee claims generally the method of propelling vessels herein described, by paddles entirely immersed in the water, and deriving a reciprocating action in the line of motion of the vessel from the movements of a horizontal wheel.

A hollow space or wheel-case is made in the middle of the vessel, considerably below water-line, open at both sides to the water, but made perfectly water-tight above, below, and at stem and stern. In this wheel case is a horizontal wheel, which

moves on friction rollers, having a vertical shaft or axis which passes through a stuffing-box in the top of the wheel-case, and works in metal bearings, one in the bottom of the wheel-case, and the other in a beam that extends across the vessel. This vertical shaft is, by means of a connecting rod, connected with the engine or other moving power with a reciprocating action. The horizontal wheel is composed of two iron rings, one at the top and the other at the bottom, having iron spokes, which extend from them to an iron nave; the spaces between the rings and spokes are filled up with wood, and the whole is covered by a metal plate or plates on both sides, so as to exhibit the appearance of a solid disc, which fills the wheel-case, and projects a little on each side of the vessel. A hollow revolving shaft, with a rectangular bore for the receipt of the paddle shaft, at each extremity, passes through the wheel from side to side, and turns freely therein. The end of the paddle-shaft that is inserted in the hollow revolving shaft is made at the inner end of a circular form, and at the outer end next the floats of a rectangular form, having a link at the inner end, by which it is secured in its place. A rope or chain is passed down, from a capstan or windlass on the upper deck, through a channel in the body of the wheel-shaft, whence it is drawn through an orifice in the hollow revolving shaft, and attached to the link of the paddle-shaft.

The leaves or floats on each paddle-shaft, two or more in number, are suspended from it loosely by hinges, on which they fall back against the arm in either direction; so that when moved through the water in a direction contrary to the line of motion of the vessel, they oppose their extended surfaces to it, and when moved in the other direction they open and present their edges only to the water.

The rope of the paddle-shaft that is first secured is passed once round the hollow revolving shaft before it proceeds to the windlass; the other is then secured with its rope passing direct to the windlass, without any such coil, so that any subsequent turn of the windlass, causing the first to be uncoiled from the revolving shaft, must cause the other to be coiled upon it. The ropes are wound once round the windlass in opposite directions to each other, and then drawn tight and secured, and the windlass is held fast by a wheel-lock hereinafter described.

The horizontal wheel at each stroke of the engine performs about one-third of a revolution, or just so much as to produce one complete sweep of the paddle-shaft. The sets of paddles act alternately; but in consequence of the motion being taken from the central axis, the vessel is moved forward in a perfectly straight line.

The wheel-lock is composed of a front and back plate, connected by a partition in the middle, the two sides being left open; at the bottom there is a small toothed wheel, which turns on a pin passing through the two plates. Above the wheel two clutches are fastened, by means of pins passing through them and the plates; the upper ends of the clutches are pressed outwards by two springs which bear against the partition. When the upper ends of both clutches are pressed outwards, they take into the teeth of the small wheel, and prevent it from moving either way; but when either of the clutches are not pressed outwards, the wheel is left free to turn in one direction.

This wheel-lock is attached to the frame of the windlass, and takes into a wheel fixed firmly to one end of the barrel of the windlass. A cord or rope is attached to the upper end of each clutch, and passed through a hole in the top of the front plate of the wheel-lock, whence it is carried down and fastened to a treadle attached to the deck, so that when it is desired to unlock the windlass, and turn it in either direction, all that is necessary is to press down with the foot the treadle which commands the clutch sought to be unlocked, when the windlass may be turned round as required.

Claim second.—The employment of a cylinder and piston, or cylinders and pistons, the former of which are moveable, and the latter stationary and hollow, and the arrangements herein described for adapting the same to practical purposes.

The machinery is contained in a rectangular frame, in the centre upright of which an axis works, carrying a cog-wheel, the cogs of which move in angular slots, and are acted upon by a double ringed eccentric, held parallel to the sides of the cog-wheel by a cross-rod, which is supported by standards affixed to the insides of the centre uprights. Two horizontal steam cylinders are placed one above the other in this frame, the upper one having a rack at the bottom throughout its whole length, and the lower one a similar rack at the top, which racks take into the cog-wheels above mentioned. Each cylinder has a broad square flange at each end, and the two cylinders are connected together at their opposite ends by vertical bars, which are secured at top and bottom to the flanges; the cylinders likewise communicate with each other at each end, by means of pipes for the admission of steam from one cylinder to the other. The piston of the upper cylinder is solid; but the piston of the lower cylinder is hollow, and has four holes through it for regulating the admission of steam, in two of which holes are placed two small cylinders, and in the other two two small pistons, which small pistons and cylinders are twice the length of the lower piston, and are connected together at each end by a plate, which the patentee terms a four-way piece.

Both piston-rods are stationary, and the upper one is solid, but the lower one is hollow, and is at one end connected with a steam-chamber, and at the other with a condenser open to the atmosphere

The steam is admitted through the lower piston-rod, and supposing the right hand end of the cylinders is close against the pistons, it then enters the cylinders at the right hand, and forces them in that direction, until the left hand end of the cylinders abut against the pistons, moving the small pistons and cylinders through the piston to the right hand, by which means the direction of the steam is changed, and the cylinders are forced in the reverse direction, the waste steam escaping through passages in the piston (opened by the movement of the small pistons and cylinders) into the other part of the hollow piston-rod, whence it proceeds into the condenser or the atmosphere.

Claim third.—The method herein described of applying a balance on the steel-yard principle to a lever resting on the safety-valve, with a weight of a fixed amount attached to one end thereof.

The patentee uses a portable steel-yard balance, the beam and other appendages of which, with the exception of the shifting weight, are enclosed in a hollow case, which case is of a determinate weight, and serves the place of the usual shifting weight, having a hole at the top by which it is moved along the long arm of the balance. To the top of the boiler is affixed a lever with a short and long arm resting on standards, and pressing on the top of the safety-valve. To the long arm of this lever is immoveably attached a ball of a determinate weight, equal to the maximum pressure at which it is designed to work the engine.

When it is desired to ascertain how much the pressure in the boiler is less than the weight with which the valve is loaded, the hook at the short arm of the balance is attached to the ball, and then by applying the shifting weight to the long arm the weight required to raise the valve is ascertained, the difference between which and the known weight of the ball is of course the quantity desired to be ascertained.

Those parts of the improvements which the patentee considers applicable to other purposes are:—First, The wheel-lock, which may be used to advantage in most cases where it is required to hold a retard wheel, and also for various other useful purposes.

Secondly, The wheel with moveable cogs and eccentric circles, which is applicable to many other descriptions of machinery besides steam-engines.

Thirdly,—The application of a balance on the steel-yard principle, to increase or diminish the weight of the safety valve of steam-boilers; as also the employment, for weighing purposes in general, of the portable steel-yard balance, the box and appendages of which are enclosed in a case, which case serves the purpose of the usual shifting weight or counterpoise.

SAMUEL DRAPER, formerly of Nottingham, now of Tiverton, Devon, lace manufacturer, for *improvements in the manufacture of ornamented twist lace and looped fabrics*, March 21.—Claim first.—The mode of actuating the warp threads of twist lace machinery.

In this machine four warp thread bars are used, two to work the front, and two to work the back warp threads. The warp threads are selected by the following contrivance:—The warp threads pass through what are called beads, which are placed horizontally, and to each of these beads two threads are affixed; one of these passes over a bar, and terminates in a weight; the other one passes through a stay, and terminates in a sliding bolt, which bolt passes through holes formed in a plate, and rests on the pattern surface of the Jacquard cylinder. There are as many beads as there are warp threads, and the front and back warp threads pass alternately through the succeeding beads. The beads are actuated by the rising or falling of the sliding bolts on the elevations or depressions of the pattern surface of the Jacquard cylinder.

Claim second.—The mode of applying two warp threads to each needle, by means of independent instruments.

This part of the invention is applied to warp lace machinery, and is an improvement on a patent formerly obtained by the present patentee.

The lever guides (fully described in the former patent) have each two eyes or openings, through which the threads pass, each of these guides laps the two threads it carries on to two different needles, by which means two threads are lapped on to each needle.

Claim third.—The mode of actuating the warp threads of warp lace machinery, by independent instruments and apparatus as herein described.

This apparatus is very similar to the apparatus first described, for working the warp threads of twist lace machinery, and consists of a series of beads (in this instance placed vertically), one to each needle, and the beads are connected to small weights, and to sliding bolts, to be acted on by the pattern surface.

The threads are lapped by what the patentee terms a lapping point bar, having a row of cranked points, with as many spaces as there are spaces between the needles, by means of which the warp threads are held correct for lapping.

Claim fourth.—The mode of working with single threads to each of the needles by means of independent instruments, worked by pattern surfaces, when lapping on two needles, by causing the thread so lapped on any two needles to pass only under the beard of one needle.

This part relates to an improvement on the former patent, in which independent guides were caused to work, by being selected by pattern surfaces, and each independent guide worked with a single warp thread, lapping on two needles; but in this instance the threads, when lapped on two needles, are pressed and looped up only on one, for which purpose the patentee applies a point bar, with as many points as there are spaces between the needles.

This point bar is so suspended as to work up and down with the sinker frame, but in addition to such rising and falling the point bar has a cam, to raise the points out of the needles when the lapping is taking place, and to allow the points to descend when the lapping has been performed, by which means the thread lapped across the two needles will not be passed under the beards of both, but only under the beard of one needle.

CHARLES HANDFORD, of High Holborn, London, tea-dealer, for *an improved edible vegetable preparation, called "Eupooi," and the mode of manufacturing the same*, March 21.—This preparation is an extract of chicory, which is obtained in the following

manner:—The chicory is roasted in the same manner as coffee, and chopped or ground into pieces about the size of pepper-corns. The chopped or ground chicory is then mixed with water, in the proportion of two quarts of water to each pound of chicory, and set on a fire to boil; after boiling for three hours, the liquid is drawn off, and strained through a flannel bag. The strained liquid is then put into a steam or hot water bath, and evaporated to the consistency of honey; it is now fit for use, and forms the preparation called "Eupooi."

WILLIAM COOPER, of Layham, Suffolk, iron-founder, for *an improved method of constructing thrashing machines and other agricultural instruments*, March 21.—The patentee claims, firstly,—as an improvement in the thrashing machine, the application of the lever to the drums and fly-wheels (whether worked by horse or hand), so as to set the beaters in motion by the power derived from the lever. Secondly,—as an improvement in the chaff-cutting machine, the above-mentioned application of the lever, so as to set in motion the wheel on which the knives are fixed, by the power derived from the lever. And lastly,—as an improvement in the mealing-mill, the above mentioned application of the lever, so as to set the millstones in motion by the power derived from the lever.

The following is the mode of applying this improvement to thrashing machines:—To one end of the shaft on which the beaters are fastened is attached a pinion, which is driven by a "drum-wheel" fixed on one end of an axis that extends through the machine, on the other end of which is a fly-wheel. The fly-wheel and drum have each a dip or crank, which is connected by levers to a horizontal iron beam above the machine, and the wheels are set in motion by the men pressing on the levers, the cranks being so arranged that while one is up the other is down.

The machine may likewise be driven by horse-power, which is applied to the levers.

The lever is applied in like manner to the chaff-cutting machine and the mealing mill.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(Continued from page 183.)

GEORGE HENRY FOURDRINIER, and EDWARD NEWMAN FOURDRINIER, both of Hanley, Stafford, paper-makers, for *certain improvements in steam-engines for actuating machinery, and an apparatus for propelling ships*, (communicated by a foreigner,) March 17.—This invention may be divided into two parts, consisting, firstly,—of improvements in steam-engines for moving machinery; and secondly, of an improved apparatus for propelling ships and other vessels.

Claim first.—The application of two pistons working in one cylinder; which pistons are simultaneously actuated by the expansive force of the same volume of steam.

The cylinder is provided with two pistons, which, previous to the starting of the engine, are nearly close together in the centre of the cylinder. In order to start the engine, the steam is admitted from a steam-box at the centre of the cylinder into the space between the two pistons, where, by its expansive force, it drives the pistons to the opposite ends of the cylinder. The valves are now shifted, and steam is admitted at the back of each piston, whereby the pistons are caused to approach each other towards the middle of the cylinder. The partially-condensed steam or vapor, contained in the central part of the cylinder, will be thereby forced out through suitable exit valves.

When the pistons have arrived at the middle part of the cylinder the valves are again shifted, and steam is admitted between the pistons, which are again impelled towards the ends of the cylinder as above described.

The rod of the lower piston is connected to a crank-shaft, and the rod of the upper piston to a cross-head bolted to lateral rods, which are also connected to the crank shaft.

The patentees show another arrangement for the purpose of overcom [illegible] ts; so that when one piston is at the dead point, the other is exerting its full force. In this construction, the cylinder is divided into two parts by a partition, and the pistons do not expand simultaneously as in the former construction, but one piston begins to move while the other is at the quarter stroke.

Claim second.—The mode of propelling vessels by forcing a volume of air against the water beneath the bottom of the vessel.

This apparatus consists in certain mechanism whereby a volume of air may be forced against the water under the bottom of the vessel, in the direction of its stern, for the purpose of impelling the vessel in an opposite direction.

The air is compressed by an air-pump to the same density as the water under the ship's bottom, and is made to pass from the cylinder of the air-pump through a pipe or tube into an air chamber. In this air chamber a hollow plug is adapted to a peculiarly-shaped valve, in which the plug may be moved up or down, for the purpose of closing the valve when required. The compressed air occupying the chamber passes through the hollow plug down a large tube, and enters the water through a tumbling valve, which consists of two vanes attached to a horizontal axis, having between them a sector rack, which is acted upon by an endless screw, when the position of the valve is required to be changed. The bottom of the vessel has two guides made of wood, or other suitable material, running parallel to the keel. The air, when it passes through the tumbling valve, is guided under the bottom of the vessel by the guides, which prevent it from escaping up the sides, and by its pressure against the water in the direction of the stern it impels the head of the vessel forward.

When the vessel is required to be backed, the tumbling valve is, by means of the sector rack and endless screw, caused to tumble over, and one of its vanes to abut against a projecting piece, whereby the air is caused to escape in the opposite direction.

The patentees show another arrangement, which consists in having two valves, which are raised or lowered by a rack and pinion, in place of the tumbling valve; one of the valves directing the air astern, and the other ahead.

ENTERED AT THE PETTY BAG OFFICE.

(Continued from page 150.)

WILLIAM BEDFORD, of Hinckley, Leicestershire, frame-work knitter, for *certain improvements in machinery employed in manufacturing hosiery goods, or what is commonly called frame-work knitting*, March 17.—In this specification, which is most vaguely drawn, the patentee makes no claim, neither does he particularise the improvements.

The front pair of standards of the machine are connected together by a bar, which is called the main bar, extending horizontally through the machine. A series of barbed needles, of the ordinary form, set in leads, are mounted upon a horizontal bar, which is attached to two end trucks, running to and fro upon bed plates fixed upon the bases of the standards; this bar with its trucks therefore constitutes a carriage, by which the needles are enabled to advance or recede.

A presser bar is made fast by screws in front of the main bar, the use of which presser bar will be shown hereafter.

A series of jacks are mounted upon a fulcrum-rod in a comb fixed on the stationary jack bar, which is supported by transverse bars connected to the front and back standards; from each of these jacks a sinker is pendant, the use of which sinker is well understood by stocking-makers.

A series of thin curved plates of metal, which the patentee calls "dividers," are placed under the presser bar, and are fixed on a bar which is screwed to the main bar, between it and the presser bar: these dividers are intended for the same purpose as that for which ordinary lead sinkers are commonly employed.

The thread from which the stocking fabric is to be produced being wound upon a bobbin, placed in any convenient situation above the machine, is led off from the bobbin by a carrier, which travels to and fro along the front of the machine.

The use of the presser bar is to close the beards into the eyes of the needles when they are receding, which is done by the needle carriage, at the moment required, rising over a small elevation on the bed-plate; by which means the heads of the needles are raised up against the under edge of the presser bar.

In this receding movement of the needles, whilst their beards are held down by the presser bar, the stitches of the preceding netted work are slid over the depressed beards; and by the time that the needle carriage has reached its ultimate receding point, the stitches of the work have been drawn over the heads of the needles, and made to embrace the loops under the beards in the heads of the needles, and thus to form of these loops a new series of stitches or range of work.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 29th of May.

Charles Wye Williams, of Liverpool, civil engineer, due May 17.

Joshua Shaw, of Goswell-street-road, artist, due May 17.

Joseph Whitworth, of Manchester, engineer, and John Spear, of the same place, gent., due May 17.

James Deacon, of Saint John-street-road, gent., due May 19.

Alexander Stevens, of Manchester, engineer, due May 19.

William Henson, of Allen-street, Lambeth, engineer, due May 19.

John Wakefield, of Salford, hat-manufacturer, and John Ashton, of Manchester, hat-manufacturer, due May 21.

William Henry Hutchins, of Whitechapel-road, gent., and Joseph Bakewell, of Brixton, civil engineer, due May 21.

FOREIGN INTELLIGENCE.

FRANCE.

CONSTRUCTION OF THE FORTIFICATIONS OF PARIS.

At a late meeting of the Academy of Sciences, M. Poncelet declared, in opposition to the opinion of M. Vicat, that hydraulic limestones would be of no use whatever in the construction of the fortifications of Paris, and that there would be no object gained by the enormous increase of expense which would attend their being adapted to that purpose. It is known that the mortar which forms hydraulic limestones possesses the property of becoming hard in water. This is effected by mixing a certain quantity of silicious substance in a state of great decomposition with common limestone. The use of this mortar, which in some places is very expensive, is not attended with any advantages in buildings not exposed to water, and the resistance to projectiles being in no degree increased by hydraulic limestones, there does not, as M. Poncelet observes, appear any reason why this plan, which though very desirable in some cases is very expensive, should be adopted in the fortifications.

SCIENTIFIC DISCOVERY.

At the last meeting of the Academy of Sciences, M. Gannal presented an important essay, which is likely to produce a considerable sensation amongst the public as well as in the scientific world. M. Gannal has been for many years occupied with the idea of preserving meat by injection. Thus, 4lb. weight of saline mixture injected into

the carotid artery of an ox, penetrates all the vessels and prevents putrid decomposition. M. Gannal exhibited legs of mutton preserved two years since by this plan, and which were found to be perfectly sweet. M. Gannal employs for this purposo the muriate of alum. This discovery is considered valuable in preserving provisions for the navy.

SOCIETY OF MANUFACTURES AND ARTS AT MULHAUSEN.

At a recent meeting of the Society of Industry at Mulhausen, some explanations were given by M. Spœrlin, respecting the improvements of the Daguerreotype effected by M. Voigtlænder. It was stated that he has succeeded in obtaining, in a few seconds, winter views, when illuminated by the sun's rays; and that the new invention of M. Daguerre is not similar to the ingenious combination of lenses by which this improvement is effected, the chief merit of which depends on the distinctness and great brightness of the image.

M. Frahlich, a mechanist at Aarau, sent a plan and description of an improved spinning machine, of his invention, which was referred to the committee on mechanics.

M. Ehrmann, in a memoir presented from the committee on chemistry on the process prescribed by M. Spœrlin, of Vienna, for the extraction of indigo from the polygonum tinctorium, submitted to the consideration of the Society some remarks on the tinctorial richness of that plant, and noticed the works of several authors who have paid particular attention to this new indigo-making substance. The committee, it appeared from their report, had not been able to make experiments on this substance in the manner pointed out, in default of possession of the necessary kind of polygonum. The society in the meantime ordered the memoir of M. Ehrmann, and the notice of M. Spœrlin, to be printed; and directed the specimens of the indigo which had been received from the latter to be transmitted to the committee on chemistry.

A paper was read by M. Henri Schlumberger, on the bleaching of linen thread. This memoir, which noticed several new researches on the subject, full of interest to the manufacturers of Mulhausen, was also referred to the chemical committee.

THE ARTESIAN WELL AT GRENELLE.

It was ascertained by experiment on Saturday that the water of the well, at the orifice of the tube whence it flows out, indicated an increase of temperature of one fifth of a degree, from which it is inferred that the strata in immediate contact with the tube have become heated by the water, so that the tube has now the same temperature throughout as the ascending water. The quantity of sand which is ejected by the tube is greater than could be easily conceived: it is estimated at 500 cubic metres (a metre is upwards of 37 English inches). M. Mulot calculates that at the point where the water below is forced upwards there is a collection of falling sand still to be brought to the top equal to that already thrown out. It is not expected that the water will issue forth clear in less than a month or six weeks, as it will require that time to remove the sand that now mingles with it and impedes its course. The well is thrown open to the public only four days in the week.

The Museum of Natural History in Paris has just received a considerable number of cases containing skeletons of animals either stuffed or preserved in spirits, plants, and specimens of rocks and minerals. They were collected during the voyage of discovery undertaken by the Astrolabe and Zelée, under the command of Captain d'Urville. Among this collection of animals from different parts of the world, the most curious are two monkeys, the singular form and the large size of whose noses have caused them to be called *nasiques*. The protuberance of this organ, which in the male specimen is not less than two inches, though less prominent in the female, gives them a very peculiar expression, and they present a striking resemblance to man. [The English naturalist, Mr. Waterton, has a specimen of a monkey with a fine aquiline nose, in his collection at Walton Hall, near Wakefield; to which he has given the name of "nondescript." He brought it with him from South America, but the very perculiar appearance of the head and face induced most persons to imagine that the natural forehead and nose had been tampered with in the preparation of the specimen.]

It appears from tables of the produce of beet-root and other indigenous sugars that the following was the position of the manufacture at the end of Feb. 1841. The number of factories in operation since the beginning of the season 1840-41 was 389; and those which, though not in actual work, contained stores of sugar were 30. The quantity of sugars entered as in the factories before the commencement of the season was 4,102,656 kilogrammes. The total quantity made during the season was 22,345,855 kilogrammes, and the quantity delivered for consumption in the same time was 15,280,474 kilogrammes.

The *Journal de St. Etienne* says that great activity prevails in the government manufactories of arms at that place. The Minister of War lately sent an order for 50,000 muskets, which were completed in seven weeks; and 1,500 percussion muskets for the army in Africa have been sent from St. Etienne to Toulon. A large number of carbines were sent off at the same time for Vincennes. The amount of wages paid weekly at this royal manufactory is 50,000 francs, from which fact an idea may be formed of the activity that prevails in the manufacture of arms in that establishment.

The Postmasters in France, whose districts lie near the proposed lines of railroad, have taken alarm at the probable consequences to them of the establishment of communication by railway. In a recent audience with the Minister of Finance the postmasters near the proposed railroads of Orleans, Rouen, Corbeil, and St. Etienne, represented that when those works were completed their relays of horses would be almost useless; and that on many lines where railways are in operation the business had almost disappeared, while the taxes with which they were charged remained the same. The Minister, in reply to their appeal, observed that the question was one of great importance, that it is the subject of his serious consideration, and that he is anxious for further information respecting its various bearings.

Dr. Funnari has been sent by the French Government on a scientific expedition to Algeria.

M. Felix Savart, member of the Academy of Sciences of the section of physics, and professor of experimental philosophy to the College of France, died last week.

The first stone of a new bridge at Charente was laid last month with great ceremony. All the houses in the town were ornamented with flags, and the ships in the roadstead were decorated with their colors. An altar was erected on one of the piles, where the stone was blessed with religious ceremonies; and bands of music and the firing of cannon celebrated the important event.

The salon of the Louvre was opened on the 15th inst. for the exhibition of the works of living artists. Upwards of 4,000 works of art were offered to the examining commissioners, of which 1,300 were rejected. The catalogue contains about 2,700 different subjects.

M. Edward Bertin, inspector of fine arts to the Minister of Interior, is about to be sent on a mission to the north of Italy, for the purpose of investigating all objects of art which appear to him worthy of being added to the collection of the School of Fine Arts.

The French Government has contracted with a commercial house at Niederhausen, in Baden, for a supply of 40,000 gun-stocks, and part of the order has been already delivered.

BELGIUM.

The Minister of the Interior has sent seed of the best kind of Havannah tobacco to the provincial commissions of agriculture, who are appointed to distribute it in their respective provinces. The seed is also given to all persons who desire it, on application to the office of the Minister of the Interior.

A rich American ship-builder is now in Brussels who offers to establish a line of five sailing packets between Antwerp and New York, of from 450 to 500 tons, to make the passage in twenty to twenty-five days. It is recommended in some of the Brussels papers, that this plan of communication with the United States should be tried previous to adopting a line of steam-packets. It is apprehended that if a steam-packet communication were opened between Antwerp and New York, the English companies would reduce the price of the passage, to put a stop to the competition of Belgium. The travellers from the Continent to America, it is also feared, would, under any circumstances, prefer taking their departure from English ports instead of Antwerp, especially if the expense were the same.

The monument of Grétry will cost the town of Liège, 50,000frs. in addition to the 25,000frs. voted for the inauguration, that is to say, 7,000frs. for the plaster cast, about 18,000frs. for the metal casting and finishing, and about 20,000frs. for the pedestal, which is now making.

A Brussels gun-maker has been authorised by the Prussian Government to establish manufactories at Wesel, for the purpose of fitting all the muskets of the army with percussion locks.

RAILWAY INTELLIGENCE,

DOMESTIC AND FOREIGN.

Bristol and Bridgewater Railway.—The exertions on the railway line from Bristol to Bridgewater at this juncture are almost incredible; an immense body of laborers are employed by night and day, and the progress of their increasing industry is daily apparent. No doubt whatever is entertained of the directors being able to open this line in June next.—*Taunton Courier.*

Birmingham and Gloucester Railway.—A special meeting of the proprietors of this railway was held at Birmingham on Tuesday, to consider whether any other than the mail trains should be despatched along the line on Sundays. The chair was taken by Captain C. R. Moorsom. Mr. E. T. Moore moved "That one morning and one evening passenger train (in addition to the mail train now running) be despatched from Birmingham to Gloucester every Sunday." Mr. Homer moved as an amendment. "That no other trains are required on the Sabbath than those now running for the conveyance of the mails." Upon a division the amendment was carried by 41 to 30. Mr. Moore did not press the original motion to a division, observing that he was satisfied the majority would be against it.

Mails on the North Midland Railway.—The directors of the North Midland railway have received notice that they are to convey the mail over their portion of the line betwixt Leeds and London (seventy-two miles) in fifty minutes less than at present. Of course all parts of Yorkshire and of the north will benefit by the earlier arrival of the mail.—*Leeds Intelligencer.*

Brecknock and Merthyr Railway.—Starting from the Dowlas branch of the Taff Vale Railway, near Pantccoed Ifor, the line will pass by Blaen-y-garth, where would be a short tunnel to Aber-criban

Bryn Jack, crossing the Taff-fechan above the latter place, and passing on the west of PontLutton, crossing the river, through the level below Danyrallt, and entering the mountain opposite the Ystrad with a tunnel 2,000 yards in length, emerging in the Glyncollwng Valley, and following the Vale by Capel Glyncollwng, Abercynhafen, Rhyd-y-bine, Aber, to the west of Cui, by Derwen-y-groes, Llanfigan Rectory, through the village of Llanfrynach, by Maes-derwen Lodge, crossing the Usk near Aber-cyndrig, and passing between the canal and river to the terminus near the Gas Works at Brecon. Compared with other railways, the cost of land will be low, as a great portion, being mountain land, is of little value. The cost of construction will be light; the strata is favorable—lime and stone in abundance. The tunnel through the mountain, being sandstone, will not require arching, so that a great saving will be made in that item. We think there can be but one opinion of the advantages to be derived to this district from the formation of the proposed line. A new market will be opened for our agricultural produce in supplying the immense population employed on the hills, with the advantage of enriching our lands with an abundant supply of lime at a low cost; coals also would be much reduced at Brecon and its neighbourhood. The passenger traffic on the Taff Vale already is a good guide in estimating the probable traffic on this line; by affording the facilities of rapid and cheap travelling, the public of all classes gladly avail themselves of its advantages; and the increase of travelling by railway is beyond all credence. We believe the measure is supported by influential parties.—*Silurian.*

The First Trip on the Brighton Railway.—The directors made their first trip on Saturday last, starting from London-bridge at ten minutes past eight; they stopped at the Dartmouth Arms station, Sydenham, and afterwards proceeded to Mersham tunnel, but were prevented from going through in consequence of some wagons being on the lines. The engine used on this occasion is one of immense power, called the "Mersham," made by Messrs. Sharp and Roberts, of Manchester. The works are rapidly progressing, and the line to within fifteen miles of Brighton will be opened to the public on the 1st of June, and to Brighton in August next. The first stone of the new line from the junction of the Greenwich Railway to the London terminus, was laid on Wednesday last by Colonel Landmann, the projector and engineer of the Greenwich Railway.

Railways and Poor Rates.—The magistrates of Croydon were called upon a few days since to decide as to the liability of the Brighton Railway Company to pay poor rate on their property in that parish. In support of the rate it was contended that they were liable although the line was not in use, because rails were laid down and used for the conveyance of earth and other purposes, constituting a beneficial occupation, which was all that was required. In reply it was stated that though profit was not necessary to create the liability, yet that it was requisite that some business or occupation should be carried on from which profit might be expected to accrue; that though the parish might suffer a temporary loss, that would be more than counter-balanced by the advantages it would ultimately receive, and that the point had already been raised and decided in favor of the company. One of the magistrates thought a railway analogous to the case of a house while being built, and which while in progress of erection was not liable to assessment to the poor rate. Another said he differed from his coadjutors on the point, and considered that the company had a beneficial occupation of the land; if it was considered they had not, he could not see where the line was to be drawn. Finally the majority of the magistrates decided that the company was not liable.—*County Herald.*

RAILWAY ACCIDENTS.

Accidents on the Great Western Railway.—On Tuesday morning, as the first train was proceeding from the Wootten Basset road to London, just before its arrival at the Faringdon station, it ran against a man employed on the line, who was knocked on to the rail, and the whole train passed over his left temple. A short time afterwards another man, working on the line near Reading, was finishing some work on the side of the road, when a portion of the embankment gave way and crushed him.

A Luggage Train on Fire.—A fire took place on a luggage train on the Grand Junction Railway, early on Wednesday morning last week, occasioned by sparks from the engine chimney falling on the top of one of the loads. The whole of the goods on the first lorry were destroyed, and part of those on the second.—*Staffordshire Advertiser.*

FOREIGN RAILWAYS.

We are informed that the works on the inclined plane of the railroad which will connect Ans to the Meuse will be certainly finished in the course of the approaching season, and that the opening will take place before the fine weather is far advanced. The locomotives that are to be used on these inclined planes will be shortly completed by the manufactory at Seraing.—*Le Fanal.*

The new company for carrying into execution the railway from Andrezieux to Roanne has commenced operations. It may therefore be hoped that this line, which is so essential as a means of opening a market for the coal of St. Etienne, will be completed to the canal of Roanne.

Paris and Rouen Railway.—A Royal ordinance modifies as follows the first paragraph of the 21st article of the statutes of the Paris and Rouen Railroad Company:—"During the execution of the works and until the completion of the entire line between Paris and Rouen the shareholders are to be paid four per cent. on the sums vested by them, and the company is to apply to that purpose the proceeds of the sums placed out at interest, or the receipts of the different parts of the line which may be successively opened, or any other accessory revenues of the undertaking; or, in case of insufficiency, a portion of the 5,000,000f. comprised within the capital, in addition to the estimated costs of the works."

TO CORRESPONDENTS.

The diagram to illustrate Mr. Ham's *arguments in reference to crank action and reciprocating motion, was not finished in time for this week; the letter shall appear in our next.*

"A Subscriber," at Edinburgh, *who opposes our views respecting the loss of power by reciprocating action, is postponed till next week, when it will appear in conjunction with* Mr. Ham's *observations on the same subject.*

Gratuitous Copies *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"The Inventors' Advocate" *is published every* Saturday Morning, *at* 7 o'Clock; and is regularly issued in Monthly Parts, of which 1 *to* 22 are now Ready.

"The Inventors' Advocate" is also published in Volumes, containing the Nos. of every 6 months.

THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, MARCH 27, 1841.

The bill for extending the copyright in designs has met with a slight check in its progress through the House of Commons, by the absence of a formality which renders it necessary to begin *de novo*, but the discussion that has already taken place on the subject shows that a large majority of the House is in favor of its principle. It is now proposed to extend the original objects of the bill to articles in glass and other materials, but the chief point on which opposition arises is to patterns on printed calicoes, and even in this respect by far the largest majority of the printers are in favor of additional protection; the only place whence objections to further protection proceed is that wherein piracy is openly practised. The principle of the bill rests on so firm a basis of justice that it is almost inconceivable how any impartial man of sense can hesitate for a moment in acceding to its proposition. But setting aside the justice of the case, the impediment the present law presents to the improvement of the manufacture forms a strong reason for its amendment on the ground of expediency alone. It was well observed by Mr. Tennent, in reply to the objections of Mr. Hume, who has been a powerful advocate for the extension of schools of design, that an improvement in public taste, unless it were accompanied by an improvement in the patterns of our manufactures, would prove a serious evil, because the people would despise the common patterns now produced by the English printers, and prefer the more elegant designs of France, though of a higher price. The want of protection which prevents the printers from engaging superior artists to execute designs that might be immediately copied has long been felt as a great check to improvement. The curious objection raised to the measure, on the ground that if protection were afforded to the extent required, foreign manufacturers might copy the designs which the other English printers could

not imitate, may be advanced as one of the strongest arguments in its favor. The most strenuous opposers of the bill, by this objection admit that the effect of the measure will be to originate patterns in England of greater elegance than can be produced abroad; and that instead of being copiers, as at present, of the French, it will reverse our respective positions. We hope their worst predictions may prove true. Friendly as we are to the measure, we do not entertain such sanguine expectations of its success as seem to be entertained by its most determined opponents.

ARTESIAN WELLS.

Public attention has been lately much directed to the method of procuring water by boring, in consequence of the success attending the long-continued experiment in Paris. After penetrating to a depth of more than 1,500 feet, the sounding instrument arrived at length at the green sand, under the chalk formation, which a knowledge of the strata of the Paris basin enabled M. Arago to predict with certainty must be attained if the boring were persevered in. The instant out-pouring of the water, and its rising in a jet above the surface of the ground, were also anticipated as the result of penetrating the chalk, but the quantity thus procured, which is equal to supply one-third of Paris, is greater than expected. It is calculated that when the proper tubes are inserted in the bore, the jet of water will rise to a height of thirty feet. This extraordinary phenomenon has given rise to ingenious speculations for obtaining an ever-ready moving power, by boring for water, and employing the ascending force to propel machinery.

The notion seems to prevail, that by boring to great depths in any situation, a jet of water may be obtained; it may be advisable, therefore, to explain the cause of the flow of water in Artesian wells, for the purpose of correcting the prevalent error. The rise of the water in wells of this kind depends entirely on the known principle in hydrostatics, that fluids tend to their level; though the rising of the water above the surface of the earth may appear to contradict this law. A short statement of the circumstances will, however, show that the action of the Artesian well at Grenelle, depends entirely on the principle that fluids find their level.

The city of Paris lies in a valley. The strata on which it rests form a kind of basin, inclining upwards to the higher surrounding ground, and dipping down into the valley. These strata consist of layers of alluvial soil, and various kinds of limestone and sand, abounding in fossil remains, to a depth of about four hundred feet; a bed of plastic clay, resembling the lower division of the London clay, is then arrived at. This clay covers the chalk, which may be considered the foundation rock on which Paris rests. Under the chalk lies the stratum of green sand which it was the object of the enterprising borers to reach, and under the sand is another bed of clay. The stratum of green sand and the chalk above it take the same direction as the upper strata, and rise, at a considerable distance from Paris, to a level much higher than that city. The rain percolates readily through the sand, but is stopped by the clay underneath and above it; therefore, as the sand is in a basin-like form, it may be considered as a great reservoir, in which is collected the rain that falls on the extended area which it presents, at the surface. It must be apparent, therefore, that if a tube be forced down through the superincumbent strata, the water in this hollow reservoir will tend to rise to the level of the water, which is pressed down with the force of gravitation in the higher parts of the concavity. As the water in those portions stands considerably higher than the level of Paris, it is thus forced above the surface of the ground, on the same principle as a fountain is made to play by connecting the jet pipe with an elevated reservoir of water. A great portion of the ascending force is, indeed, lost by friction, otherwise the *jet d'eau* would be much higher. If, on the other hand, the aperture were as large as that of a common well, the supply would not be sufficiently rapid to form a jet with so large a column of water, and the well would only run over. This is no uncommon case when wells have been sunk to great depths in situations favorable to the ascending fluid. At Derby, for instance, a well of this kind was sunk, and in order to make the ascending power of the water available, strong water-proof walls were built round the well, so as to raise the level of the water within it above the tops of the houses to be supplied.

It appears, from the foregoing consideration of the action of Artesian wells, that they can only be successfully made when the position and the nature of the strata are favorable; and that it is requisite the spot should be below the upper level of the subterranean reservoir. It is necessary also that the water in that reservoir should be confined above and below by strata almost impervious to water, otherwise there could be no continuous supply; for the water would either precolate through the strata beneath, or it would be forced into, or absorbed by, the earth above. There is no ascending power obtained in Artesian wells by the smallness of the bore; the only difference in this respect between common wells is, that the supply is not sufficient to force the larger mass of water into a jet. It may be assumed, therefore, that in all cases where the water in Artesian wells rises in a jet, a common well, if sunk on the same spot of an equal depth, would overflow.

NEW INVENTIONS.

A DOUBLE PISTON STEAM-ENGINE.

Among the specifications of patents which are published in the present number of our journal, there is an invention, one of the objects of which is to obtain a double action from the same volume of steam. This is attempted to be accomplished by having two pistons working in the same cylinder, and introducing the steam between them. Both pistons thus move in opposite directions, and a double motion is produced. The intention of the inventor appears to be, to render available the force of the steam which commonly presses against the top and bottom of the cylinder without producing any motion. It will appear, however, on a slight consideration, that no power can be gained by such an arrangement; nor can any contrivance be effected to save steam power on that principle. The piston in this engine, which would, in ordinary engines, form the motionless bottom of the cylinder, does, indeed, perform the same quantity of work as the piston above it; but that is effected by a double consumption of steam. This will be very evident, when it is considered that the space moved through by the two pistons, from the centre to the two ends, is only equal to the motion that would be communicated by one piston moving from the top to the bottom; and that the same cylinder full of steam is employed in each case. The motionless bottom of an ordinary steam cylinder forms the point of re-action, without which no motion can be obtained. Whether the re-acting point be fixed, or whether, as in the case of the double-piston engine, the acting and re-acting points be reciprocal, in either case the same volumes of steam of equal densities will exact the same efforts, and, all other things being equal, will do the same amount of work. A *point d'appui*, as the French term it, is absolutely necessary to produce motion, and all attempts to gain power by rendering the point of re-action moveable, must, therefore, prove nugatory.

IMPROVED METHOD OF TINNING.

A description of the process for a new mode of tinning, by which iron is completely protected from oxidation, will be found in the specifications of patents. This is effected by forming an amalgam of iron, nickel, and tin, which is applied to the metal in the usual manner. We have seen several specimens of sheet iron tinned in this manner, in which the coating of tin seems much more perfect than is obtained by the ordinary process. We understand that it has been tested by submitting it to the action of the strongest acetic acid without its being in the least affected. This will, consequently, prove of the greatest importance in the manufacture of tinned iron vessels, for it is well known, that the present mode of tinning affords a very inadequate protection against corrosion.

CARBONIC ACID GAS ENGINE.

The *Fanal* gives the following account of a renewed attempt to apply the elasticity of carbonic acid gas as a moving power. Mr. W. Coley Jones, an English chemist, is now in Brussels, where he is making experiments which tend to decide the possibility of substituting carbonic acid gas for steam as a moving power applicable to railroads, &c. The plan of Mr. Jones is entirely different to that of the celebrated engineer Mr. Brunel, who many years ago took out a patent for the application of this gas as a moving power. This idea was suggested to him by the discoveries of Davy and Faraday on the liquefaction of some aeriform fluids, supposed capable of constant elasticity; but Mr. Brunel was unable to make any practical use of this gas. The apparatus necessary for the construction of a machine on the plan of Mr. Jones consists of two cylinders, in which the substances used for generating the gas are placed separately on the plan of M. Tillorier, and are then brought into action after they are enclosed. Two narrow cisterns containing these liquids it is said are sufficient without fire to convey the trains over all the railroads, and to propel ships from one pole to the other. [We fear the expense of the materials requisite to produce a sufficient quantity of carbonic acid gas will operate against the practicability of attempts to render this force available as a moving power.]

SIGNALS TO PREVENT COLLISIONS TO SHIPS.

The ordinary lights placed at the head and on the poop of ships, even when those lights are colored, are not sufficient protection against danger. By those means the proximity only of a vessel can be discovered, but it is impossible to determine the precise course in which she is steering, so that two vessels meeting on a dark night may be able to avoid each other. To enable ships so circumstanced to steer clear of one another in the same manner as if it were day-light, it is necessary to employ a number of differently colored lights so disposed that on seeing them it may be at once known to which of the thirty-two points of the compass the ship is sailing; by this means collisions would be avoided. A patent has been taken out to accomplish this object with almost mathematical precision. These lights are provided with fourteen glasses presenting six different colors variously placed. On whatever side these colors are seen they always indicate, and with precision, the course of the ship, as distinctly as if it were in open day. During a fog, sound-signals consisting of very shrill whistles are added to the lights; by the number of the repetitions of which whistles the course of the ship is made known.

NEW MODE OF PROPELLING CARRIAGES.

A new plan of propelling carriages on railways has been patented by Mr. Joseph Scott, of Great Bowden, near Market Harborough, which seems in some respects to resemble Mr. Rangeley's rotation railway. In Mr. Scott's plan a continuous line of cog-wheels, of from eighteen to twenty-four inches diameter, work in standards firmly fixed to sleepers in the centre of the line. These wheels are to be put in motion by communicating with stationary engines at certain distances. A pioneer carriage, or conducting machine, with an iron cog bar fixed underneath, the cogs of which fit into the teeth of the cog-wheels, occupies the place of the locomotive engine. To this conducting machine the other carriages are to be attached, and when the wheels are in motion the conducting machine is moved forward by the cogs, and drags the other carriages after it. The wheels of the carriages are intended to run on rails, or on a tram-way. The inventor proposes various modes of carrying his plan into operation, but the continuous line of cog-wheels, set in motion by stationary engines, constitutes the main feature of the invention, as applicable to propelling carriages on railways.

IMPROVEMENTS IN STEAM-BOILER FURNACES.

The following notice of some improvements lately adopted in the construction of the furnaces of steam-engine boilers, by M. Denieet, sen., an engineer and machinist, is given in the French publication *L'Ancre*. A more particular description of the nature of the improvement by which the effects stated are produced is promised in a succeeding number.

"Until the present time, almost all the furnaces of steam-engines have been constructed on the same plan; the same false and injurious principle is universally adopted; they are constructed on one system, and it might be said, that they are all the work of one builder, so little difference is perceptible between them. Among the number of defects remarkable in the present furnaces, resulting from their defective construction, we will particularise the following. The furnaces communicate too much heat to a certain portion of the heating surface of the boilers, and communicate scarcely any heat to the rest of the surface, though the heat ought to be equally distributed; hence the frequent repairs requisite in the parts of the boilers that have been too much heated, and the increased danger of explosions. The calorific effect of a portion of the combustible gas is destroyed by its not being entirely consumed; there escapes up the chimney also a considerable quantity of coal, in a state of almost impalpable powder, carried away by the draft without being burnt. Hence arises that dense black smoke which announces from a distance the presence of a steam-engine, and which is, also, too often the cause of complaint and annoyance to those in the vicinity. They consume too much coal, and do not make the most of that which is used. On the present plan of constructing furnaces it is not possible instantaneously to intercept the communication of the flame with the boiler, which on many occasions would be very advantageous.

"We can instance in support of our assertion, the steam generators of the chief manufactory in the department of Haut-Marne. They have scarcely worked from 500 to 600 days of 12 hours each, and have had part of their surfaces renewed nine times. The furnaces which heat these generators must consequently be very bad, when their operations are attended with such results. These engines also consume five kilogrammes of coal an hour for every horse-power, which is double the quantity that a good engine ought to consume. We will notice, in passing, another steam-engine at the same establishment, placed at the mouth of a blast furnace, and heated by the flame that escapes. In this case, notwithstanding the quantity of heat which may escape from the gases at the furnace mouth when burning, these gases have never been made to communicate heat to the boiler. They become, in short, entirely extinguished when brought into contact with the pipes of the boilers, and are not relighted till they reach the chimney, the walls of which they make red hot.

"So little has the management of this kind of furnace been understood, that the engine has been taken to pieces, and altogether stopped, rather than attempt those necessary improvements which common sense suggests should have been made.

"The arrangements which we have made for generators, heated either by flame direct from the fuel, or by the flame of gases escaping from blast furnaces, have enabled us to attain the following results:—The whole heating surface of the boiler is raised to the same temperature, whatever the length of the boilers may be. The generators last considerably longer time, in consequence of not being burnt in places as they formerly were. Being no longer exposed to the flame of a furnace of a high degree of temperature, they are not in danger of becoming red hot, and the chances of explosion, if not impossible, are extremely rare. All the combustible gases are completely relighted and burnt; they do not become extinguished till their heat is exhausted, and they are converted into incombustible gas. Coal dust is also entirely consumed by the burning gas, and no dense smoke is seen issuing from the chimneys, which it is no longer necessary to build to so great a height.

"All the gas and coal being turned to account, the saving in the consumption of fuel is considerable. The heat underneath the generators may be diminished without extinguishing the fire, which is of advantage in cases when, owing to a mistake, the water in the boiler is too low. It is then possible to let it cool, and avoid the explosion which usually happens from this cause.

"The plan on which our furnaces are constructed is remarkable for its simplicity, any experienced builder being able to execute them."

SCIENTIFIC CORRESPONDENCE.

ELECTRO-MAGNETIC CLOCK.

To the Editor of the "Inventors' Advocate."

Sir,—I see by recent publications in various periodicals, that Professor Wheatstone, of King's College, is stated to be the inventor of the application of electro-magnetism as a moving power to clocks. I beg respectfully to state, that Mr. Wheatstone is not the author of this invention. I communicated it in correspondence to Mr. Wheatstone on the first day of August last, with the view of having his opinion on the subject, and also to see if he would join me in bringing it forward. Since then, I have, with Mr. Barwise, of St. Martin's-lane, secured exclusive right to the invention by Her Majesty's Royal Letters Patent. By giving this a place in the next number of the "Inventors' Advocate," you will greatly oblige, Sir, your obedient servant, ALEXANDER BAIN.

March 24, 1841.

35, Wigmore-street, Cavendish-square.

THE GALVANO-ARSENICAL APPARATUS.

To the Editor of the "Inventors' Advocate."

Sir,—I perceive that you have done me the honor, in No. 81 of your journal, to notice a Galvano-Arsenical Apparatus of mine, but unfortunately the name of *Martin* is introduced for that of *Morton*. Since it was shown at the Royal Institution, I have been induced to simplify it by employing one tube only, which being increased in size, I am enabled to collect a larger quantity of gas; for I find when organic fluids are being decomposed by it much froth is formed, and this rising into the jet, interferes with the combustion of the gas. By rest however this falls.

The only objection to this alteration is, that the analyst must be careful to connect the gas receiver with the *negative* electrode of the battery, or the arseuuretted hydrogen evolved will escape.

I am, Sir, respectfully yours,
W. J. T. MORTON.

Royal Veterinary College, March 23, 1841.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(Contributed expressly to the Inventors' Advocate.)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING MARCH 29, 1841.

Tuesday	Civil Engineers	8 P.M.
	Chemical Society	8 P.M.
Wednesday	Society of Arts	7½ P.M.
Thursday	Royal Society	8½ P.M.
	Antiquaries Society	8 P.M.
	Zoological Society	3 P.M.
Friday	Royal Institution	8½ P.M.
	Botanical Society	8 P.M.
Saturday	Asiatic Society	2 P.M.
	Westminster Medical Society	8 P.M.
	Mathematical Society	8 P.M.

ROYAL INSTITUTION.

March 19. Friday Evening Meeting.

Mr. John Thomas Cooper delivered a lecture "on the Messrs. Elkingtons' mode of Gilding and Silvering Metals." He commenced by stating that the old art of gilding and silvering, as practised, had until lately been brought to a very low ebb, owing to the malpractices adopted by various individuals in producing materials of a very inferior order. The object Mr. C. had in view in the present discourse, was to point out the mode by which the old process of silvering and gilding is conducted, and then to describe the methods recently employed by the Messrs. Elkington, who have secured to themselves many patents of late years.

The mode of plating metal by the old process was then described. A piece or block of copper as pure as possible is procured, and a plate of silver is then soldered to its surface, in a furnace, by the assistance of borax and heat; the proportions by weight of these materials is 3 lbs. of copper to three quarters of an ounce of silver. The silver thus employed is not required to be absolutely pure: but it is advisable that one pound weight should be alloyed with 18 penny-weights of copper, in order to give it the necessary hardness, when it is passed between the rollers of the flatting mill, and thus allow of the equal distension of the two metals. From the material thus rolled out plated articles of ordinary manufacture are made; but although the coating of silver on the copper is so extremely thin, yet the metal is of sufficient opacity to reflect its color; this very thin layer is however soon removed

by continued friction, when the copper becomes evident, especially on the edges of the articles.

In the process of the Messrs. Elkington there are various operations necessarily concerned. A solution of silver in dilute nitric acid is to be obtained, from which the silver is to be precipitated in combination with a variety of substances, all of which are more or less applicable for the purpose, such as the precipitation of the sulphurets of silver, by the addition of the *hydro-sulphurets.* The white *chloride*, obtained by adding common salt, or the white precipitate likewise thrown down, as the *cyanide*, by the addition of cyanide of potassium. To this list many others might be added, such as the precipitates afforded by the alkalies and their carbonates. The different precipitates above-mentioned are all soluble in an excess of the cyanide of potassium, and those so obtained are the best adapted for precipitation by the voltaic battery.

Gold is of all the other metals capable of the greatest extension under the hammer. Gold leaf is of so thin a nature as to allow light (of a green color) to pass through it when placed on a sheet of glass and viewed against a bright light. It is computed that it would require 50,000 of the fine leaves of gold, when compressed one on the other, to make an inch in thickness. The only solvent for gold is chlorine; and this is usually presented to the metal in the form of nitro-muriatic acid (aqua-regia of the old authors), when a solution of it is required. The solutions of gold are precipitated by various substances. The nitro-muriate of tin, when added to solutions of gold, affords no precipitate until the addition of the protomuriate of tin, when a purple-colored-powder is instantly thrown down, known generally by the name of the *Purple powder of Cassius.* This Mr. Cooper considered to be the most certain and best mode of procuring this substance, so much used for painting on china, glass, &c. Another precipitate afforded by the addition of the protosulphate of iron, and of a brown color (which is the gold in its metallic state), is that used for fancy painting and gilding on china, &c., and when placed in shells or saucers is termed *shell-gold.* The sulphuret of potassium throws down a dark brown precipitate of the sulphuret of gold, which preparation is considered the best adapted for Mr. Elkington's process; especially after being dissolved in a solution of cyanide of potassium, when it becomes applicable to all the purposes of gilding hereafter to be described.

The process formerly adopted for coating the surfaces of metals was then noticed. If brass were intended to be gilded, it was made perfectly clean by dipping it into common aqua-fortis, and in a few moments after washing it in water, by which it becomes absolutely cleaned. It was then dipped into a solution of proto-nitrate of mercury, and thus coated. This constitutes the first part of the process known as *water-gilding.* To the surface thus amalgamated an amalgam of gold and mercury was uniformly spread over its surface. The article was then subjected to a heat sufficient to volatilise the quicksilver, and the gold remained firmly adherent to the surface of the brass; and which, after brushing with a wire *scratch brush,* burnished, &c., was sent to the market. These articles may be so treated once, twice, or thrice; constituting single, double, or treble gilt work. This was the process in general practice until a few years since, when the Messrs. Elkington discovered a mode of applying or depositing gold on the surfaces of metals by a process not hitherto adopted, and which they secured to themselves by patent right. It was simply this:—to a dilute solution of gold crystals of bicarbonate of potass are added (which causes effervescence, owing to the escape of carbonic acid gas). This solution is then boiled, and after some time it changes color, and is considered then in a fit state to gild by dipping; the articles to be gilded, having been properly cleansed, are immersed only for a few moments, when they become coated in a very uniform manner with the metal, and almost any quantity may be deposited by repeated and continued immersions by a *peculiar process;* and here Mr. Cooper begged to contradict, in justice to the Messrs. Elkington, an assertion which had but a few evenings back been made by a lecturer, when treating of another subject (we presume by Mr. Smee), who stated that the metal deposited by the Messrs. Elkingtons' process was a *mere film only.* This Mr. C. proved to be not the case; in support of which he had that morning instituted an experiment to prove his assertion. He procured some of the act of parliament buttons, as they are termed (having only 5 grs. of gold on the gross), and analysed them for the *quantity* of gold; the results, when compared with those obtained from the same number of buttons of Messrs. Elkingtons' manufacture, were of very secondary importance indeed (at least ten times the quantity).

Mr. Cooper then described in detail the last improved process of the Messrs. Elkington, for which a patent was granted about ten or twelve months since. The principle consists in using several solutions of gold and silver with the voltaic battery, more especially those which are procured by the solutions of the oxide, chloride, or sulphuret of silver in the cyanide of potassium, and the oxide or sulphuret of gold in the same menstruum. The deposit is accomplished by rendering the clean surfaces of metals electro-negative while immersed in these solutions; by such means any amount of either of the precious metals may be precipitated and accumulated on the surfaces of the baser metals, that may be desired by the purchaser or vendor of the articles so manufactured, and a complete adhesion of the deposited metals to the surfaces on which they are intended to be thrown down is effectually accomplished and a uniform thickness or coating pervades the whole of the article. Those articles which are said to be silver mounted, being for the most part manufactured of the thinnest rolled silver that can be obtained, which is so thin that it cannot be struck up into form without being placed between two plates of very thin rolled copper; and these, when backed with lead or pewter struck into various devices, are generally known by the terms of silver mountings or edges. One great advantage of this mode of gilding and silvering is, that the articles can be engraved or chased before they are subjected to these processes, and do not appear to lose any of their sharpness or distinctness by the above methods,—the deposition of silver being uniform over the entire surface, as was shown beyond all doubt by the section of the nozzle of a candlestick, which exhibited a considerable thickness of silver to the naked eye, evident to the most casual observer.

MICROSCOPICAL SOCIETY.

March 17. *George Loddiges, Esq., F.L.S., &c., in the Chair.*

Dr. John Lee, Mr. T. L. Wheeler, and Mr. H. White were proposed as members. The chairman stated, that owing to the increasing number of specimens and books recently acquired by the society, the council considered it necessary to appoint an office of honorary curator and librarian; and they were happy to be able to recommend Mr. John Quekett, a gentleman they considered eminently qualified. The recommendation, on being submitted to the meeting, was carried unanimously.

A paper was then read from Mr. George Busk, of the S.H.S. Dreadnought, being "Observations on the Structure of the *Tricocephalus Dispar.*" These entozoa are frequently found in the cæcum of the human subject after death, and Mr. Busk's opportunities of examining them have led to the discovery of some important structural facts connected with them. Rudolphi, and others since his time, have given as their opinion, that the extremity of the oviduct in this worm opened in common with the large intestinal, as is the case in many animals; but this opinion, hitherto considered an anomaly in the class to which the *Tricocephalus* belongs, can exist no longer, for Mr. Busk has clearly proved that the oviduct opens about the centre of the vent, and is altogether separate and distinct from the large intestines.

The secretary stated, that the report read at the first anniversary meeting, together with the president's address, had been printed, and was ready for distribution.

The meeting then resolved into the usual Microscopic Illustration and Conversazione.

BOTANICAL SOCIETY OF LONDON.

March 19. *John Reynolds, Esq., Treasurer, in the Chair.*

Specimens of *Saponnaria Vaccaria*, from Winterbourne, near Newbury, Berkshire, were presented by Mr. Harbot. Mr. H. O. Stephens, of Bristol, forwarded some interesting Fungi for the Collection. Mr. Thomas Sansom exhibited living specimens of *Crocus Vernus*, obtained during the last week from Ray's old habitat, at Hornsey. The continuation of Mr. Arthur Wallis's Remarks on the Orchideæ of Essex, was read.

The secretary announced, that Mr. Daniel Cooper had resigned the office of Honorary Curator, which he has held from the establishment of the society, and that the council had elected Mr. Geiger, a German botanist, on a salary.

ROYAL GEOGRAPHICAL SOCIETY.

A very full general meeting of members was held on Monday evening, G. B. Greenhough, Esq., President, in the chair. Colonel Jackson introduced to the notice of the meeting a beautiful instance in which the electrotype process had been introduced to maps, being the first of the kind which had been executed. The map, which was presented by Captain Beaufort, was of the Island of Ascension, and there was no distinction between this specimen and the one from which it had been taken. There were also exhibited two embossed maps from Mr. Ackerman, which were comparatively cheap, and gave a good idea of the places they represented. Captain Grey gave an account of his survey of five years of the coast of Asia Minor. The whole coast had been re-surveyed by this expedition in one continued triangulation, as also part of the Morea and Attica. He will return on the first of next month to survey Candia, to ascertain the longitudes of the places on the eastern basin of the Mediterranean, to Acre and Jaffa, and thence to Jerusalem. The whole of the survey, when completed, will be one of the most interesting and important undertaken for some time. A paper was next read from Col. Lloyd, being an account of a recent journey across the isthmus of Darien, in which he gave an interesting description of the Mandingo Indians, a pure and unmixed, intelligent and warlike tribe, inhabiting the Atlantic side. These alone maintained their freedom against the Spaniards, to whom they are very hostile, and whose lives are not safe in their territories; but to the English they are very friendly, and exhibit a disposition which it would be very desirable to cultivate. A short paper was also read from Mr. Abbott, containing an account of Ghelore, the richest of all the Persian provinces on the borders of the Caspian Sea.

ON WARMING HOUSES BY HOT WATER.

BY DR. WILKINSON, BATH.

The quantity of water in pipes of different dimensions is in the same lengths proportionate to the square of their respective diameters, whilst the radiating surface is only in the simple ratio of their diameters. Thus a gallon of water being equal to 231 cubic inches; supposing the thickness of metal to be $\frac{1}{4}$ of an inch in a 4 inch pipe, it will require 2 feet in length to hold 1 gallon. The inch pipes employed by Perkins are of the same thickness, so that the tubular part is half an inch in diameter, and hence will require 49 times the length of pipe to contain one gallon, equal to 98 feet, such being as the square of $3\frac{1}{2}$ inches to $\frac{1}{2}$ an inch, being 49 times greater in length, whilst the surfaces exposed are

only as 8 to 1; and, therefore, supposing the water in each pipe be preserved at the temperature of boiling, viz., 212 degrees, it will only require 16 feet in length of the smaller pipe to expose the same surface as 2 feet of the larger; it is hence evident that only ono-third of the quantity of water is required, and a proportionate saving of metal and fuel.

In pipes of four or more inches iu diameter, the boiling point of water is rarely exceeded, whilst the lowest degree of temperature in the small pipes employed by Perkins is more than three times the heat of hoiling water, and in a similar proportion the radiation of heat is increased, and with the same increased rapidity warmth is transmitted to different apartments. About two years since I was requested by the Duke of Beaufort's agent to make some experiment on the mode then adopted for warming Badminton, and we could not succeed in raising the temperature in the library and conservatory more than 10 degrees; this apparatus was removed, and the small pipe system adopted; every required warmth is now obtained, with less than one-third of the fuel before used. A similar case occurred in a large room at the British Museum, which I visited with Mr. Perkins; the large pipes, being found inadequate, were removed, and I was informed weighed more than 7 tons, whilst a superior heat was transmitted by the employment of only 15 cwt. of small pipes. There is also a material difference in the time required for the distribution of the heat; many hours are necessary for the production of that temperature by large pipes, which is accomplished in one hour by means of small pipes. In some situations, pipes pass through cold passages, and in intense weather subject the water to be frozen, in consequence of which, the circulation being prevented, the pipes in the furnace become softened, and give way to the pressure of the heated fluid; the water is converted into expansive steam, and if, as occurred lately in Manchester, the furnace is imprudently placed in a depôt of combustible materials, danger is incurred; the warming apparatus in this case appears to have been very indifferently arranged. To guard against any such results, Mr. Perkins attaches to his apparatus a safety valve; and when high heat is employed all danger from obstructions of this kind are most effectually prevented. It appears that the fire took place on a Monday, so that during the very intense frost the fire was extinguished for two nights and a day, while, if a gentle combustion had been preserved in the furnace during that time, sufficient heat would have been produced to have prevented any freezing result. In my own residence I have adopted Mr. Perkins's plan, and by means of a single coil of pipes in the entrance passage, during the late intense frost, at an expense not exceeding sixpence per day, sufficient heat was radiated from the single coil, so that every room in the house was at a temperature between 50 and 60 degrees.

I have made no comparative observations on the employment of heated air—on every principle the effects are not only unpleasant, but also injurious. —*Bath Journal.*

DISPUTED CLAIM FOR IMPROVEMENTS.

ROLLS' COURT, March 19.

BOURNE *v.* THE PENINSULAR STEAM NAVIGATION COMPANY, HARTLEY AND OTHERS.

The Master of the Rolls gave judgment in this cause on Friday. The object of the application was to obtain an injunction to restrain the persons who lately comprised the Peninsular Steam Navigation Company, from selling three vessels called the *Braganza*, the *Royal Tar*, and the *Tagus*, to the newly-chartered company called the Peninsular and Oriental Steam Navigation Company, into which the old company had fallen. The Peninsular Steam Navigation Company, it appeared, had entered into an agreement with John Bourne, dated the 7th of March, 1840, to allow him one-third of the profits arising from the saving of fuel, as a remuneration for the use of certain improvements in steam-engines, and in boilers, furnaces, and stoves, of which the plaintiff was the patentee, and which were in pursuance of the agreement fitted on board the ships. Upon the formation of the newly-chartered company, it was arranged that they should purchase these ships, which they claimed to do free from any charge in respect of the agreement made with Mr. Bourne, who, in consequence, instituted the present suit to obtain a performance of the agreement. It was stated that the improvements had been introduced into the steam-ship *Liverpool* by William Fairbairn and Co., engineers, as the agents and under the control of the plaintiff, and though there had been a saving of fuel, still there were disadvantages which counterbalanced the advantage, inasmuch as it prevented ready access to the machinery for the purpose of stopping or backing the ship. The defendants also insisted that the plaintiff had been using the vessels for the purpose of trying experiments, and not for introducing his patent apparatus. These allegations were denied by the plaintiff, who further insisted, in answer to a charge that the power of the machinery was lessened hy having to turn certain fans for the purpose of creating a strong current of air to drive the gas generated in one furnace through the red-hot coals of another furnace, for the purpose of consuming tho smoke, that the rapid generation of steam for working the machinery more than supplied any loss of power occasioned by turning tho fans—all which, he insisted, had been proved by a year's experiment on board the *William Fawcett.* The case occupied the Court several days.

Lord Langdale, in pronouncing judgment, said, the object of the invention for which the plaintiff obtained his patent was to economise fuel by separating the parts of which it was composed so as to obtain a complete combustion. The patent was obtained in October, 1838, and experiments were made which were alleged to have been successful. The invention was applied on board the *William Fawcett*, one of the defendants' vessels, and was said to have succeeded. The plaintiff, in March, 1840, entered into the deed of agreement with some of the defendants, by which he was bound within six months effectually to apply his invention to the steam-engine machinery of the three vessels, and to such other steam-vessels as might belong to the defendants, at an expense not more than £120 for each vessel. The plaintiff began making alterations in the machinery of those vessels and of the Liverpool. Those alterations were said to have been not according to the principles of his invention, but the plaintiff contended they were so in the *Royal Tar* and the *Braganza*, and that he was desirous of going on with the other vessel, but the defendants disputed his right under the deed of agreement, and contracted to sell the vessels, which occasioned him to file his bill and move for the injunction. The question was between the plaintiff and those with whom he entered into the agreement; the company had no peculiar right. The plaintiff was aware at the time of the contract that the alienation of the vessels was in the contemplation of all the parties. It was said that it was not the real object of the parties that the particular apparatus specified in the patent should be applied, but that the plaintiff was to be at liberty to make alterations. One object was to produce combustion by meaus of a great draught of air. Experiments were made by the plaintiff for a considerable time, but they were found to occasion inconvenience in the management of the vessels, and the defendants would not suffer them to be continued. A question was made whether the plaintiff had not a right to proceed; the plaintiff was desirous to apply his inventions so as to reduce his principles to a practical effect, but he was not in a position to do so, nor was he entitled to prevent the defendants from alienating their vessels. He (Lord Langdale) must refuse the injunction moved for, but the costs must be costs in the cause.

SCIENTIFIC MEMORANDA, AND NOTES ON ART.

The Niger Expedition.—The vessels fitted out for the expedition to the river Niger, were inspected by Prince Albert on Tuesday at Woolwich. The Prince went on board the Albert. one of the vessels which was lying at Deptford, and sailed down the river to Woolwich, where the other vessels were. The principal peculiarities in the construction and fittings of the Albert, were pointed out to the Prince, who seems to take much interest in the expedition, as well as the nautical instruments, the method of correcting the compass (which was explained by Professor Airey himself), the sliding keels, Captain Smith's paddle boats, Mr. Grant's patent fuel, and Dr. Reid's ventilating and medicating apparatus, the latter of which was an object of peculiar interest. Dr. Reid explained and superintended the ventilating experiments performed on board, in which he was assisted by Dr. M'William, surgeon of the ship, and head surgeon of the expedition, in whose charge the ventilating apparatus is placed, illustrating its action by exhausting the air from the various compartments and afterwards propelling it into them, by altering the arrangement of the valves; various odorous matters and other substances were successively communicated to the air, which rendered its progress visible. These experiments were concluded by filling the lower deck (where the men sleep) with a dense smoke, which was rapidly exhausted, and discharged by the fanners, proving the command which the apparatus had in regulating the movements of the air. The paddle-box boats of Captain George Smith also excited much interest. Captain Smith showed the method of getting them off and on the paddle wheels. These boats are covered with another boat of basket work, with a cover of sailcloth over all, making altogether four boats, in addition to the number on board other steam vessels fitted in the usual manner.

The Niger Expedition.—On Saturday the officers of the Niger expedition, accompanied by a number of men from the different ships, visited both Houses of Parliament, when Dr. Reid gave a series of experimental illustrations on ventilation, pointing out more particularly the system adopted in both Houses for extreme diffusion, and various arrangements for the filtration and purification of air, similar to some of those which will be put in operation on board the steam ships when they reach the coast of Africa.

Boat for the Niger Expedition.—There is now constructing in the boat-house of Woolwich Dockyard a boat of a singular appearance, being formed similar to some of the shallow creels used in carrying fish in sea-port towns. The boat is about 20 feet long and 10 feet broad, and about 2½ feet deep, and yet it is so light that it is capable of being carried any distance on the shoulders of four men. It is formed of thin strips of wood, about 2 inches broad, and woven together exactly in the same way as Indian matting, and it is intended to cover the outside with waterproof canvass. The purpose for which it will be used is to cross shallow creeks and rivers, and from its size appears capable of carrying 30 men. It will be placed above the life-boat on board the steam-vessel when not in use, and will answer as an excellent protection to it from the meridian rays of the sun in the tropical climate to which the expedition is bound.

The Thames Tunnel.—The great difficulties which have impeded the completion of this undertaking may be said now to be overcome. The work has been completed under the river, and the shield, the *avant courier* of the structure, is now below the company's wharf on the Middlesex side. The operations at Wapping for completing the shaft, by which foot passengers will descend, are in full activity. 30 feet of this shaft have already been completed, leaving about 40 more to be accomplished. The natural ground which has been already touched is favourable for the gradual and safe descent of this enormous mass of brick-work. The engineer has in some respects varied the scale upon which the shaft is constructed as compared with that which was sunk years ago at Rotherhithe, by constructing it larger at hottom than it will be at its summit. Immediately the shaft has been sunk to its required depth, the shield will be advanced from its present position, having traversed 33 feet 6 inches. The communication throughout the entire length of the tunnel will be then thrown open. The run of water from the land springs into the tunnel at present is from 400 to 500 gallons per minute. When, however, the communication has been thrown open between the whole line, this influx will cease. The engine, with less than half its power, throws off the water arising from land-springs, and the visitors' archway up to the shield is perfectly dry. It is expected that the ceremony of opening the Tunnel will take place about the end of next summer. We hear that Her Majesty is about to confer the honour of knighthood upon Mr. Brunel. The acting engineer (Mr. Page), and indeed the whole body of workmen, most of whom have been employed from the commencement on this apparently dangerous work, are most anxious for its entire completion. The shield presents a very novel appearance, as now lighted up—viz., that of a Gothic window —*Times.*

Discovery of a River in New Holland.—The Sydney Herald of the 21st of August, says —We have received intelligence that a splendid river has been discovered between the Clarence River and Moreton Bay. Our correspondent states that it has 30 feet of water on the bar, and has been visited by a Mr. Scott, who states that he traced it up for more than 30 miles, and believes there is more cedar upon it than all the rivers hitherto discovered, and he describes the country as most beautiful.

Carbolein.—We lately translated from the foreign journals accounts of M. Waschinakoff's invention of a combustible material much more efficacious than coal; which promised to be of great utility, in steam-boats particularly, as the same calorific effect could be obtained from a much smaller bulk and weight of fuel. The experiment was stated to have been proved on the *Sirius* steam ship in its passage from St. Petersburgh, and that the carbolein was found to answer most completely. This account, however, seems to have been somewhat exaggerated, as the trial was not on a sufficiently large scale to be satisfactory. The following is the report of its action sent by Mr. Waters, the commander of the Sirius, to M. Waschinakoff.

"*Sirius*, Copenhagen, 24th Oct., 1840.

"SIR,—In compliance with our promise regarding your 'fuel,' supplied to this vessel for the purpose of experiment, we have to inform you, that at 1 P.M. on Thursday, 22nd inst., we weighed one *ton* of common coals, and consumed the same in one hour, generating our common consumption of steam. At 4 P M. same day, we commenced burning your fuel, and so powerful was the fire produced by it, that in less than half an hour we were obliged to draw three fires (out of nine). We conceive it to be fully equal to your expectations '*as fire*.' It gives the strongest fire we have yet seen; —but we do not conceive that the quantity supplied to us was sufficient to enable us to give a positive assertion as to its efficiency, or as to the possibility of its resisting '*spontaneous ignition*,' when exposed in quantities to damp and friction; and one thing is positive, that the fire-places and flues of our modern boilers are totally unfitted for the consumption of so powerful a fuel as what you supplied us with. Further, we pledge ourselves that the very last morsel of your fuel has been consumed. We are, &c.,

"D. C WATERS, Lt. R. N.
W. DINCEN, Engr."

Venus and Sirius.—During the beautiful nights which we have had this month, the amateurs of astronomy have observed the simultaneous appearance of two of the most brilliant stars in the heavens. In the south-east, Sirius, the most brilliant of all the fixed stars, and which by its great distance eludes all our means of measuring his diameter, or how far he is from the solar system. Towards the west is the planet Venus, the phenomena of which can be exactly determined. According to the calculations at the Observatory at Paris, the disc of Venus is now twenty-six seconds diameter, and the planet attained her greatest elongation or angular distance from the sun on the 4th inst. According to the parallax assigned by the astronomical tables of the Observatory, the absolute distance of this brilliant evening star is now about seventeen millions of leagues; her disc of so pure a brightness, is only illuminated in part. It presents now a phase of the first quarter, hut this curious appearance, of which Galileo made the discovery, can only be seen by a good telescope. As to Sirius, it is at least four hundred thousand times more distant than the planet, and yet it is a brighter star. It is absolutely impossible to form an idea of the true size of these suns, which appear so brilliant notwithstanding these immeasurable distances.—*Journal des Debats.* [There was yesterday afternoon, an eclipse of the planet Venus by the Moon. The planet was concealed from sight about an hour. The phenomenon could only be observed by a good telescope]

Deep Well at Southampton.—The works of this important undertaking were resumed on Monday, hut after working one of the engines for about ten hours, an accident occurred by the breaking of the fly-wheel shaft of the north engine. It seems that by the present arrangements, immense quantities of water can be raised from the shaft to the surface, as on Monday, with only one engine and one pump at work—and those working at only one-half the speed to which the engine is equal—the quantity of water delivered from the pump nozzel exceeded 12,000 gallons per hour; and this, too, when the water to be raised was upwards of 150 feet from the surface level. The present depth of the shaft is 300 feet, the excavation for a large portion of which is upwards of 16 feet diameter. We have reason to believe, that for the purpose of obtaining a supply of water, there has been no other shaft constructed of so large a diameter, or with such durable material, for so great a depth. The difficulties encountered in sinking the shaft thus far have been of no ordinary kind, notwithstanding which, no one engaged in the undertaking appears to be discouraged. On the contrary, each misfortune appears to excite fresh exertions. The commissioners and contractors have decided to sink the shaft to a much greater depth. Whatever the result may be, the inhabitants of Southampton will, by this work, solve the important problem, whether or not a copious supply of good water can be obtained, by sinking a capacious shaft in a basin geologically situated as is their increasing town, and as is also similarly situated the great metropolis with its suburbs.—*Hampshire Independent.*

Artesian Well at Vienna.—For some time past these works had been going on in the vicinity of the barracks in the Corn Market, when, after digging 96 Austrian fathoms the undertaking was crowned with complete success, in the first week of the present month. The water rushes up in such abundance, that it has been estimated to exceed 24,000 *eimer* per day, and when it first made its appearance, it was with some difficulty that several shops in the neighbourhood were preserved from inundation. The temperature of the water is stated to be 13 degrees of Réaumur; the water itself is described as unfit for drinking.

Roman Mines in Spain.—A correspondent in Catalonia sends to the Perpignan Journal some further particulars relative to the discovery, on the mountain called Santo Spirito, near Carthagena, of a shaft leading down into mines which were opened by the Romans, but had not been worked for many ages. Three men descended to a great depth, and discovered several passages, most of them obstructed by large blocks of metallic ore, but the sides supported by masonry and other means. They entered one vast space, where they saw vast pools of water, and heard the sounds of falls or torrents. The first explorers dared not venture further, hut others have since gone down, and ascertained that the mines contain various caverns with traversable ways, and other shafts leading to veins of inexhaustible wealth. Permission from the Government being obtained, quantities of the ore have been analysed, and proved to contain large portions of both gold and silver. It is added, that a company of British and Spanish capitalists is about to undertake the working of the mines.

Bottomless Lake.—The following is the first notice we have ever met with of a very remarkable pond, in Saratoga county, New York. If the account, which is taken from the *Troy Mail*, be true, it discloses a curious natural phenomenon:—"White Lake is situated about one mile west of the Paulius Kill, in the town of Stillwater. It is nearly circular. It has no visible inlet, but its outlet is a never-failing stream of considerable magnitude. The name is derived from its appearance. Viewed from a little distance it seems of milky whiteness, except a few rods in the centre, which, by the contrast, appear perfectly black. The appearance itself is singular enough, but the cause itself is still more remarkable. From the centre or dark portion of the lake, at stated seasons, innumerable quantities of shells are thrown up of various sizes and forms, but all perfectly white. These float to the shore, and are thrown upon the beach, or sink into shallow water. Hundreds of bushels might be gathered from the shore after one of these periodical up-springs; and the whole soil for several rods on every side of the lake is composed of these shells, broken or decomposed by the action of the weather. In the centre of the lake bottom has never been found, although it has been sounded to the depth of several hundred feet. Where, then, is the grand deposit from which has been swelling up since the memory of man these countless myriads of untenanted shells? Is it possible, that, though far remote at an elevation of several hundred feet above them, this bottomless well may, by some subterranean communication, be connected with the grand shell marl deposit in the eastern part of the State?"—*Montreal Courier.*

Old Roman Fortress.—The Archæological Society of Wiesbaden has lately discovered on the Pagan mountain, near that town, the foundation of an old Roman fortress, which was defended by 28 towers, and surrounded by three wide ditches. Traces of the barracks for the men, the guard stations, the residence of the commandant, baths, and other buildings, are easily distinguished, showing that these are the largest remains of Roman architecture hitherto found in Germany. The excavations on this interesting spot are to be continued.

Kew Botanic Gardens.—Mr. Aiton, F. L. S., has recently resigned his situation as curator, and Sir W. J. Hooker, Professor of Botany in the University of Glasgow, has been appointed in his place. There is no doubt that a greater efficiency will now be given to this national establishment, which, about twelve months since, it was proposed to abolish, and on which much anxiety was bestowed, on account of the discussions in the Houses of Parliament. By this appointment, the chair of Botany in the University of Glasgow becomes vacant.—*Morning Chronicle.*

Destructive Engines in Warfare.—As a recent invention for blowing up and destroying ships or towns has of late excited considerable curiosity, the annexed extract from the travels of Count Falkenstein (Joseph II., Emperor of Germany) will be read with interest:—"A native of Dauphiny, by name of Dupré, who had spent his life in cultivating the science of chemistry, invented a kind of fire, so rapid, and so devouring, that it could neither be avoided nor extinguished: water, instead of destroying it, gave it new force. Various experiments were tried with it on the Canal of Versailles, in the presence of the King (Louis XV.), which were repeated at the arsenal of Paris, and in several seaports. The most intrepid soldiers trembled at the effects of so diabolical an invention, and considered it with the same horror that the ancient knights felt at the discovery of gunpowder. Being convinced that one man, assisted by such an art, could destroy a fleet, or burn a city, the King commanded Dupré never to communicate his secret, and paid him for his silence. His Majesty, however, was at that time engaged in a ruinous war; the English braved him in his harbors, and every day he suffered losses and disgrace. He could easily have destroyed his enemies, but he preferred to suffer rather than to augment the evils of humanity. Dupré is since dead, and his dangerous secret lies buried with him."

Polytechnic Institution in Birmingham.—Amongst the novelties recently added to this exhibition is a model of a locomotive engine, by Mr. Inshaw, intended for working on common roads. The engine is made to ascend an inclined plane of six inches in three feet, with a load twice its own weight attached. The principle on which the engine is constructed is novel and simple. It is stated that the engine would sustain no injury by the inequalities of turnpike roads.—*Midland Counties Herald.*

Taxes on Literary and Scientific Institutions.—A meeting of gentlemen connected with, or deputed by, various literary and scientific institutions in Manchester, was held, on Monday, in the Concert Room of the Literary and Philosophical Society, Dr. Dalton in the chair, when resolutions were passed in favor of two bills about to be introduced into Parliament; "to exempt from the Window Tax buildings occupied by Scientific or Literary Societies," and "to enable town councils, overseers, and commissioners to exempt from Borough, Parochial, and other Rates, buildings occupied by Scientific or Literary Societies."

Mr. Harris's Lightning Conductors.—It appears from the return moved for by Lord Eliot, M. P., that the following ships have been fitted with these conductors since July, 1839—viz: the Caledonia, 1st rate; the Rodney and Foudroyant, 2d rates; the Southampton, 4th rate; and the Tweed, 6th rate.

British Association for the Encouragement of Science.—"In the *Times* of August 26, 1840, we said, in speaking of this body, 'There is a spirit of persecution in the Association as well as a spirit of favoritism; and there are certain doomed victims whose very merits expose them to the relentless spite of its councils and coteries.' Subsequent circumstances have confirmed this fact more strongly than ever we anticipated. We have for some time past been collecting materials for an exposure of a transaction of the council and office-bearers of this association, by which, to the utter *dis*couragement of science, it encourages favoritism and persecution. We shall refrain from details at present, because the act of gross injustice to which we allude does not appear to have quite reached its consummation, but we shall not neglect to watch its progress, and to report on it, if necessary. In the mean time we would suggest to the members of the council, that if they are of opinion that the conduct of English men of science should be regulated by the honesty and honor which characterise the acts of English gentlemen, they will pause before pursuing any further the course hitherto adopted by them in the matter in question".—*Times* March 25.

VARIETIES.

Steam Ships to Calcutta.—An arrangement of the greatest public importance is on the point of being concluded between the East India Company and the directors of the Peninsular and Oriental Steam Navigation Company. It is well known to all persons connected with India how great and constant an effort has been made to extend the advantages of steam communication to Ceylon, Madras, Calcutta, and other places besides Bombay, and how much blame has been thrown upon the East India Company for not assisting cordially in such extension. They are now, it seems, about to relieve themselves from that imputation, if not by taking the whole matter under their own superintendence, at least by lending very powerful assistance to other parties with whom there is every prospect that what is required will be done effectually. They have therefore proposed to the company above mentioned to grant them a premium of £20,000 per annum for five years, which will commence as soon as the first of their vessels of 1,600 tons, and 500 horse power, shall be put on the line between Calcutta and Suez, and with the further stipulation that within one year from the date of the first voyage, an addition shall be made for the service of that line of two vessels of equal power. This grant is independent of any contract for the conveyance of the mail on the route mentioned that may subsequently be entered into, only that it is to merge into any such contract as may be concluded in the course of the five years in which the premium or gratuity is to operate. The East India Company will thus be placed in a situation to judge of the competency of the parties to fulfil the higher duty which would be confided to them, in the event of their having the conveyance of the mails on so important a route, before they thereby subject the public to any risk. The proceeding is, therefore, both a judicious and a liberal one on the part of the East India Company, who still maintain their original engagement with Parliament, by conducting it upon their own responsibility. So much has been done already by the Oriental Company, that little doubt need now be entertained of the success and of the extension of the project.—*Times.*

British Queen and President Steam Ships.—It was whispered in the more select commercial circles on Monday, that the British and American Steam Navigation Company had sold their magnificent ships, the British Queen and President, to the Belgian Government. The President is now on her voyage from America, and will, it is added, have to be surveyed before the contract can be considered definitively concluded; but, if our information be correct, of which we have no doubt, the British Queen has already been "proved," and is, in fact, the property of the Belgian Government. The future destination of the two vessels is scarcely less certain. The Belgians are anxious to push their commerce in every possible way, and we believe it will turn out that the British Queen and President have been purchased with the view of forming a regular steam communication between Antwerp and New York.—*Morning Post.*

Fatal Accident from Machinery.—On Saturday afternoon William Turner expired at Westminster Hospital, in consequence of injuries sustained on the previous morning, whilst at work at Mr. Smart's saw-mills, in York-road, Lambeth. The deceased was gathering the saw-dust from underneath the sawing machine, which is worked by a powerful steam engine, when one of the large wheels caught his jacket, and drew him in amongst the works, and before the engine could be stopped, the bone of his right thigh was broken, and the ribs on both sides and the breast-bone forced into the cavity of the chest.

South Sea Whale Fishery.—The Sir James Cockburn and the Eclipse arrived on Saturday in the London Dock from a South Sea whaling voyage; the former had been out during the unusually long period of three years and ten months, and is full, her freight consisting of 2,550 barrels of oil. The Eclipse is not a full ship, she has been out three years and four months, and has brought home 2,250 barrels. The Surprise, Captain Smith, which arrived last week, was out three years and a day, and her freight of oil was 2,540 barrels; making a total for the three vessels of 7,340 barrels of oil.

Parliamentary Grants.—We find from a return just laid on the table of the House of Commons, in accordance with a motion made by Mr. J. C. Herries, that the amount of grants of Parliament for the service of the year ending the 1st April, 1841, was as follows:—Army, £6,616,853; Navy, £5,824,074; Ordnance, £1,893,358; Canada, £354,746; China, £173,442; and Miscellaneous, £2,760,040. The estimated amount of demands outstanding, or charges incurred, stands thus:—Army, £753,000; Navy, £1,421,068; Ordnance, £610,840; Canada, £154,497; China, £23,442; and Miscellaneous, £1,314,769.

Fatal Coal Pit Explosion.—An explosion of carburetted hydrogen gas took place on the morning of the 16th inst., in one of the Duke of Hamilton's coal pits, near the town of Hamilton, in Scotland. There were six men and a boy in the pit at the time, all of whom it is supposed were killed immediately. Seven other men who were at the mouth of the mine, thoughtlessly went down to relieve the sufferers, but the "after damp," as it is called, suffocated them, and three died before they were drawn up again. The shaft in which the explosion took place was open at both ends and thoroughly ventilated. The carburetted hydrogen is supposed to have suddenly issued from some fissure in greater quantities than usual, so as to reach the explosive point.

Flemish Wooden Shoes.—A manufactory of *sabots* was attached to the back mill, and sold for 5d. and 6d a pair for the largest size, and half that amount for those suited to children. Surely the introduction of these wooden shoes would be a great accession to the comforts of the Irish peasantry, as well as a new branch of employment in the manufacture. An expert Flemish workman can finish a pair within an hour, and with care they will last for three months. Four pair of thick woollen socks to be worn along with them cost 18d., so that for 4s. a poorman might be dry and comfortably shod for twelve months. In winter especially, and in wet weather, or when working in moist ground, they are infinitely to be preferred; and, although the shape may be clumsy (though in this respect the Flemish are superior to the French), it is, at least, as graceful as the half-naked foot and clouted shoe of the Irish labourer. I doubt much, however, whether the people, though ever so satisfied of their advantages, would get over their association of "arbitrary power and brass money" with the use of "wooden shoes."—*Tennent's Belgium.*.

Legacy, &c., Duties.—It appears from a return moved for by Mr. Hume, that the amount of capital on which the several rates of legacy duty were paid in Great Britain in 1840 was no less than £40,441,678. The amount of capital on which the same duties were paid in Ireland for the same period was £2,087,233, the amount of duty on legacies received being £26,394, and that on probates and administrations being £40,581. The total amount of revenue received in the United Kingdom during the year 1840, for stamp duty on legacies, probates, administrations, and testamentary inventories, &c., was £2,192,010. The total duty received from the year 1797 to the 5th of January, 1841, in the United Kingdom, amounted on legacies to £33,400,104, and on probates, administrations, and testamentary inventories, to £26,707,9:0.

Discovery of Old Coins in the City.—We hear that some curious discoveries of old coins, bones, &c., have lately been made in pulling down the French Protestant church in Threadneedle-street, by Mr. Moxhay, the purchaser of the ground from the city. One of the coins so discovered has been shown to us. It appears (although the image and superscription are almost entirely effaced) to be one of Charles I.'s reign. It appears, from a reference to old books and records, that the space in the immediate vicinity of the French church, which is enclosed on one side by Threadneedle-street and on the other by Old Broad-street, was formerly laid out in gardens. The removal of this unsightly edifice and some of the circumjacent buildings will effect a most desirable improvement in the vicinity of the new Royal Exchange.

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THE

INVENTORS' ADVOCATE,

AND JOURNAL OF INDUSTRY;

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FIAT JUSTITIA, RUAT CŒLUM

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LOSS OF MOTION BY RECIPROCATING ACTION.

The discussion to which our recent article on reciprocating steam-engines has given rise renders it necessary that we should again revert to the subject, for the purpose of explaining more fully our views, and of considering the objections that have been raised to them.

The principle for which we contend is this; that in reciprocating steam-engines, in which the motion is reversed at each stroke, there must be a loss of power by this reciprocating action, unless the whole momentum each way be effectively exhausted by the time the piston arrives at the top and bottom of every stroke. To this point our correspondents, whose letters appear in another part of the present number,* do not direct their attention. Their remarks refer more to the adaptation of the crank for the transmission of motion than to the loss of power by reciprocation. It is, however, broadly asserted by Mr. Ham, that the crank is so admirably adapted for the conversion of reciprocating motion into rotary, that its application, with the aid of a fly-wheel, *does* exhaust all the momentum from the beam before the motion is reversed, and that it cannot be otherwise. He maintains that this is effected by means of the crank, independently of any regulation for working the steam expansively. The reciprocating beam, when connected to a fly-wheel turned by a crank, is considered, in this view of the case, to act like a vibrating pendulum, the whole ascending force of which is expended in gaining a new source of power before it descends. Our anonymous correspondent occupies the same ground, and takes his position with more show of confidence, backed by alleged experiment, than does Mr. Ham.

If these assertions be correct, the question of loss of motion in steam-engines by reciprocating action will resolve itself solely into the consideration of the loss by crank action; which question we wish to keep for the present apart from the other. We shall endeavour, therefore, to show in what respect we conceive our correspondents to be mistaken in their statements and views of the transmission of reciprocating motion.

It will be perceived, in the first place, that they both reverse the order in which the motion is really communicated in steam-engines, and suppose the reciprocating motion to be produced by the rotary momentum of the fly-wheel, instead of the motion of the wheel being the effect of the reciprocating action of the piston-rod and beam. In this mode of considering the action, the piston-rod is represented to be gradually retarded, whilst the motion of the fly-wheel continues nearly constant; though, in fact, the real action is the reverse of this, for the piston is impelled with nearly regular force throughout its stroke, while its effects on the fly-wheel tend greatly to accelerate the motion of the latter at those points where the action of the piston-rod becomes least direct and effective. It will, perhaps, be contended, that the action of the fly-wheel at those points is independent of the piston-rod, and that it is actuated by the velocity acquired in those parts of its revolution where the connecting rod acts with greatest effect. We are of course ready to admit, that the momentum acquired at one portion of the circle of revolution will give an impulse to the fly-wheel in those portions where the impulse is less direct, and will thus tend to equalize the motion, but the relative motions of the piston and of the fly-wheel must vary materially at every part of their course. The velocity of the wheel, for instance, will be much greater, in relation to that of the piston, towards the conclusion of each stroke, than at half-stroke; and the question, in this mode of considering it, seems to resolve itself into this; does the piston-rod impel the fly-wheel, as it approaches the end of each stroke, or does the fly-wheel impel the piston? Our correspondents have argued as though the latter were the case; we shall endeavour to show that in either view of the mode of operation there must necessarily be a loss of momentum.

We assume that the steam is freely admitted under the piston to the end of the stroke; for the system of working expansively is stated by Mr. Ham to be quite independent of that of reciprocation. The piston would consequently be impelled with the same force at every part of the stroke. If, then, the action of the piston-rodon the fly-wheel diminishes as the piston approaches the top and bottom of the cylinder until it entirely ceases, and the engine is indebted for motion to the power previously imparted to the wheel, it is evident that the steam power exerted in impelling the piston towards the end of its stroke is absolutely lost. The power employed, it is assumed, is the same at all parts of the stroke; though, according to this hypothesis, it works effectively only at certain points. If, on the other hand, we assume that the fly-wheel is constantly impelled by the piston, we must suppose that the wheel is made to move through the greatest space when the power of the steam can be exerted with the least effect.

When considering reciprocating action in connection with the means of transmitting power by the crank, the chief point to be determined is, whether the peculiar properties of the crank enable it to fulfil the conditions which we contend are requisite before loss of power by reciprocation can be avoided; that is, does it afford the means of exhausting the whole momentum each way before the motion is reversed? It appears to us that it does not accomplish this. The fly-wheel serves, indeed, to regulate the motion, and connected with the crank it may tend to retard the piston near the termination of the stroke, but the motion thus retarded is not effectually employed; it is for the most part lost, and exerted injuriously on the axis of the crank.

But, independently of this loss of motion, which we contend must result from the reciprocating action of the piston, the loss is, as we contend, increased in beam-engines by constantly reversing the motion of that heavy mass. The case mentioned by our anonymous correspondent is not stated as the result of actual experiment, it seems merely a supposititious illustration. But admitting it to be the fact, that a fly-wheel to which a given velocity is communicated will continue to revolve as long, or longer, when connected with a heavy beam than when detached, the motion of a wheel revolving freely, and communicating motion to a beam, is scarcely applicable to the case of a beam which receives and imparts a fresh impulse at every stroke of the piston, and serves to communicate motion to the wheel, instead of being indebted to the latter for its reciprocating action.

The question as regards the beam is shortly this; is the whole momentum in either direction effectively expended before the motion is stopped and reversed? We have stated, in a previous article, that in our opinion were the beam of a steam-engine to be suddenly detached from all connecting machinery the instant before its action

* Pages 218 219.

was reversed, it would continue in the direction in which it was moving, and that therefore this momentum, whatever be its amount, is lost in the working of the engine. Could this be determined experimentally it would settle the question of the loss of motion by mere reciprocation in beam steam-engines. The loss of motion by crank-action would still have to be considered. This is a subject, however, to which we shall have to allude further on a subsequent occasion.

PREVENTION OF STEAM-BOILER EXPLOSIONS.

We translate the following from an article in the *Emancipation*, a Brussels paper, under the title of "Some new Facts relative to Railroads and Steam-engines." The remarks chiefly relate to the prevention of explosion of steam-boilers, by improving the instruments in present use for ascertaining the quantity of water in the boiler, and also the amount of pressure of the steam.

"Dreadful explosions of steam-engines have continued during the last years. One of the chief causes to which the greatest number of these accidents may be attributed continues to be the sudden return of the water into the boiler after it has sunk below the proper level. Many remedies have been proposed to obviate this, independently of the additional pump which is now attached to a great number of boilers, and which permits the introduction of a supply of water into the boiler whenever it is required. Yet the contrivances that have been hitherto proposed are of no further use than to give notice when the water is low, and to signify the increased danger of explosions; but they are not calculated to prevent those explosions; they warn the engineer of the danger which probably threatens the engine, but leave the care of preventing it to him; they do not in any way contribute to remove the cause of the danger. Consequently these attempts are very inefficient, and the remedy only partial. Yet it is of importance to understand the slightest efforts that have been made to remove so serious an evil.

"We shall, therefore, endeavor to give a description of one of the most curious of these attempts. The small instrument to which we are about to allude is the invention of the inspector of steam-navigation on the Seine. We have seen it used in almost all steam boats which navigate the Haut Seine; vessels which are propelled by high-pressure steam A large glass cylinder, closed at the top, communicates at its lower end, by means of a copper tube, with the boiler of the steam engine; this pipe is inserted in the boiler a little below the proper level of the water. The pressure of steam forces the water into the copper tube and into the glass cylinder. A hollow metal ball floats on the water in the cylinder, and by its appearance indicates that the water in the boiler is above the orifice of the copper pipe. If the water level should fall below this orifice, and if, consequently, the emptiness of the boiler should indicate any danger, the phenomenon suddenly changes, and in the following manner: in this case the copper tube attached to the boiler above the level of the water immediately becomes empty as well as the glass cylinder, and the metal ball falls to the bottom, which gives the first warning. But the apparatus now communicating with the steam becomes filled with it, and the power of the elastic fluid often causes the cylinder to burst, which is a much more decided warning than the former, and one to which it would be almost impossible not to pay attention. Let us add that on such occasions the copper tube closes spontaneously, so as to prevent the escape of the steam.

"This apparatus has already been many times in operation, and the appointed signal has always been observed; but it is rather expensive, though it is true; it is not attended with the inconvenience of allowing the steam to escape, which is the case with the fusible plugs which were suggested many years ago. The great disadvantage attending it is, that like the latter it is destroyed every time it is brought into operation. The engineer is, therefore, deprived of its co-operation for the remainder of the journey. Before we take leave of this particular question, we will add that those contrivances formed on the assumption of a certain fixed level in steam-engine boilers are not at all adapted to boats, because constant fluctuations in the level are produced by the movements consequent on the progress of the vessel, which have no connection with the real level or diminution of the water in the boiler.

"The question of manometers has also excited a great deal of attention. But it may be positively affirmed that it has made no perceptible progress.

"The open manometer is, without doubt, the most exact and certain of all instruments of this description. But it is known that the principal reasons which prevent its being generally used, are, in the first place, the great expense of this apparatus, which requires a great quantity of mercury, and does not cost less than from three to four hundred francs for a high-pressure engine; and in the next place, the difficulty of placing an apparatus which is so large, and so liable to be broken, on locomotive-engines. Neither is this apparatus so effective as might be wished. It makes the engineer acquainted with the exact pressure of the steam at the moment of examination; it indicates the increase of that pressure, but does not remedy it. Now, on such a subject, the possession of information does not amount to the solving a difficulty; to know danger is not to escape it.

"Such, in substance, are the well-founded criticisms which have been passed on manometers in general, and on open manometers in particular. But independently of these general inconveniences, closed manometers, those in which the air is compressed, are attended with many serious objections, and which scarcely admit of great confidence being placed in the latter, particularly after they have been for a certain time placed on the boiler.

"These manometers, in the first instance, are attended with an inconvenience, easily to be removed it is true, of having under certain circumstances an incorrect graduation. The workmen who construct them do not take into account the variation of the mercury; it is not then possible by means of these manometers to obtain great precision in the measure of the tension of steam. In pressures of six atmospheres for example, in the greatest number of these instruments only half an atmosphere can be ascertained with certainty. The nature of the error would also tend to make the engineer feel too much security.

"A second defect in closed manometers is, that when they have been used some time, they lose part of the confined air. It has in fact been ascertained that the volume of this air is diminished from being submitted to the influence of mercury, and that the influence of the contact of these two bodies renders the manometer after some time incorrect.

"A third, and last defect of closed manometers is, that the air can sometimes escape from the closed tube where it is retained by the mercury, on sudden and considerable diminutions of the tension of the steam All these causes combine to prove the incorrectness of closed manometers.

"M. Pèclet has proposed to remedy these various defects. The apparatus which he has described, in fact, obviates these difficulties, but it is rather complicated; not so much in its arrangements, as in the manipulations that it would require from the makers of the instruments. We shall now give a description of the machine proposed by M. Pèclet:—

"This philosopher forms his manometer of a very large glass bulb, communicating with the boiler by a pipe fastened to the upper part. Another very small capillary tube is fixed to the lower part of the bulb. It is bent into the form of a UV, and rises up vertically. It afterwards extends towards the right in a horizontal direction, and to the length of about half a metre. The extremity of this latter branch of the tube is closed; it is filled in the greater part of its extent by a gas, which has no effect on the mercury—hydrogen gas for instance. This gas has also been previously dried. The remainder of the instrument to the middle of the ball is filled with mercury.

"The consequence of these arrangements is, that the mercury in the apparatus preserves its level, and in the second place, the volume and nature of the gas contained in the tube are unchangeable, however long the manometer may be used. The first two difficulties that we have just been describing are then removed. As for the last, M. Pèclet adopts the following method:—He continues to make towards the middle of the branch of the tube formed like a U, a small bulb or cavity which the gas from the middle of the tube must fill before it can escape.

"This instrument, if properly constr o form an excellent manometer; but the difficulty of getting it properly made seems to throw an obstacle in the way to its adoption."

THE MANUFACTURING ESTABLISHMENTS AT COUILLET.

The following account of the manufactories carried on at Couillet, near Charleroy, taken from *Le Fanal*, gives a most flourishing description of the iron manufactures in Belgium:—

"Couillet is only half an hour's journey from Charleroy, and by Charleroy is generally understood all the surrounding localities which give importance to a town, which in itself is very disagreeable, and has nothing to recommend it. A simple description of this great depôt of industry, will give some idea of its extent and importance. Many of our readers have heard the name of that establishment again and again, but they cannot form an idea of its amazing extent. It was surpassed only by one rival in Belgium; but Seraing was too large, it was like Mount Athos, overwhelmed by its own weight.

"Couillet possesses eight blast furnaces. There immense cauldrons, in which the coke and the ore produce every morning and evening lakes of boiling metal, which is run every twelve hours. There are also two furnaces of fine metal; a large manufactory for making fire-proof bricks; a rolling apparatus, where the thickest bars of iron are rendered as pliable as the smallest needles. There is also a large foundry, a manufactory for steam-engines and machinery; two large forges; a workshop for the construction of boilers, those prime movers of modern industry, where the roaring steam is at once confined and rendered formidable.

"Couillet is able to produce in one day 80,000 kilogrammes of cast-iron, 20,000 kilogrammes of fine metal, and 50,000 kilogrammes of bar iron of all sizes. It can produce in a year steam-engines equal in aggregate power to the force of 1,200 horses, working without ceasing. It consumes daily in the manufacture of cast iron 240,000 kilogrammes of ore, 320,000 kilogrammes of fuel, 80,000 kilogrammes of calcareous earths; an enormous total of 640,000 kilogrammes of materials. Couillet may be judged of by a single comparison. The whole of Belgium produced in 1820 45,000,000 of cast iron; Couillet alone supplied 30,000,000; that is, two thirds. And at the present time, when our increased production of cast iron amounts to 90,000,000, Couillet still contributes a third part

of it. We, notwithstanding, do not include in this calculation 8,000,000 kil. of metal which come from the refining furnaces. It consumes in the manufacture of iron 15,000 kilogrammes of fine metal, 50,000 kilogrammes of cast-iron, and 110,000 kilogrammes of fuel per day.

"The coal mines of Marcinelle belong to Couillet; all the coal that is extracted from them, as well as a part of that from its other mines at Chatelet, are consumed by its blast furnaces. The moving power employed in the ramifications of this colossal establishment is upwards of a thousand and thirty-five horses constantly at work, this power being given by twenty-seven steam-engines. Besides this, it employs from 16 to 17,000 workmen in the manufactories and collieries.

This magnificent establishment of Couillet has been entirely formed in less than ten years under the direction of M. Henrard.

PATENTS.—BRITISH AND FOREIGN.

PATENT NOT SPECIFIED LAST WEEK, WHEN DUE.

THOMAS PAIN, jun., of Upper Seymour-street, Euston-square, student at law, for *a plan by means of which carriages may be propelled by atmospheric pressure only, without the assistance of any other power, being an improvement on the atmospheric railway now in use*, due March 22.

ENGLISH EXPIRED PATENTS.

BENJAMIN ROTCH, Esq., of Furnival's Inn, London, for *a diagonal prop for transferring perpendicular to lateral pressure*, March 22.

JAMES STEWART, of Store-street, Bedford-square, pianoforte maker, for *improvements in pianofortes, and in the mode of stringing the same*, March 22.

JAMES WOODMAN, of Piccadilly, perfumer, for *an improvement in shaving and other brushes, which improvement is also applicable to other purposes*, March 22.

JACOB PERKINS, of Fleet-street, London, engineer, for *improvements in the construction of steam-engines*, March 22.

ARISTIDES FRANKLIN MORNEY, of Ashburton-house, Putney-heath, for *improvements in smelting ores, and extracting metal therefrom*, March 27.

MATTHEW BUSH, of Dalmonach-print-field, near Dumbarton, for *improvements in machinery for printing calico and other fabrics*, March 27.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 199.)

WILLIAM HIRST, of Leeds, Yorkshire, clothier, for *improvements in the manufacture of woollen cloth, and cloth made from wool and other materials*, March 24.—Claim first.—The mode of commencing the milling and fulling process on fabrics made into sheets.

This invention relates to cloth formed by the felting process. The cloth after being made by the above process is passed through a surfaco press, the surfaces of which are hollow; they are formed of cast iron, and are heated by steam. The cloth is guided through the press by four rollers, and as it passes from it, is wound on to a roller, which is turned by the workman at intervals, in order to bring a fresh portion of the cloth into the press, each portion as it is received into it being subjected to pressure from the upper heated surface.

Claim second.—The mode of carrying on the process of milling and fulling cloth made of wool, or of wool and other fabrics, as described. The cloth on the roller is now covered with calico, and placed in a fulling and milling machine, which consists of a trough having a false bottom perforated with holes; on one side of the trough is a partition, by means of which steam may be admitted beneath the false bottom. The cloth is subjected to pressure from a plank which is raised or lowered by a screw, fresh portions of the cloth being brought under the plank at intervals by means of a fabric which is wound on a roller at the top of the machine, whence it descends, and passing under the cloth is fastened to another roller at the top of the machine, which last roller is moved partly round every time the plank is raised, by means of drivers hinged to the same; so that the fabric is gradually unwound from one roller and wound on the other one, thereby moving the cloth roller partly round, each time the plank is raised.

GEORGE GOODMAN, of Henley-in-Arden, and of Birmingham, needle and pin manufacturer, for *certain improvements in the manufacture of mourning and other dress pins*, March 24.—Claim first.—The application of the processes of rubbing and dry-pointing to the manufacture of pins.

Claim second.—The process of hardening and tempering as applied to the manufacture of pins.

Claim third.—The use of heads of silver, or any other metal or metallic alloy previously plated or coated with silver, to stems of tempered steel in the manufacture of dress pins.

Claim fourth.—The scouring and glazing of the stems of pins, and the scouring of the heads before being fixed on the stems.

The patentee cuts the wire intended to form the pins into pieces the length of two pins each, these are held together by their ends being placed in two iron rings, and are softened by exposure in an oven to a red heat. They are now straightened while still red hot by the process called "rubbing;" and afterwards pointed in the same manner as needles, by grinding them upon dry stones instead of the steel mills usually employed in the manufacture of pins. When iron is used in the manufacture of these improved pins, the pointed wires are next converted into steel, by embedding them in powdered bone-dust, and heating them to the requisite temperature; but when cast steel wire is used this process is obviously unnecessary. The pointed wires are now again rubbed as before described, and afterwards divided. After this the pins are completed by hardening, tempering, and blueing or blacking, by two different processes, in one of which the pins are headed while soft, and in the other they are previously hardened. In the first of these the soft stems, after being headed in the usual way, are hardened in the following manner:—An iron tray is kept at a red heat in a furnace, and upon this the pins are placed in sheet iron trays; as soon as they are sufficiently heated they are removed from the furnaces and shaken into water, having on its surface a stratum of oil. The pins are next tempered by being heated, and afterwards scoured by agitating them in a vessel containing soap leys and sand or emery. The pins are now blued or blacked in the ordinary manner.

The other process is as follows:—The stems are first submitted to the process called "nicking," they are next hardened by being heated in rows on bars of iron, and then thrown into water that has on its surface a thin stratum of oil.

They are now tempered by exposure to the heat, and after being picked, and the crooked ones straightened, are submitted to the process called by needle-manufacturers "scouring." The stems are laid many tiers deep upon a cloth, and mixed with oil, soap, and flour emery; the cloth is then rolled up and tied with strings, and subjected to a rolling motion by a machine resembling a mangle; they are worked in this manner several days, the mixture of oil, soap, and emery being often renewed, and the stems washed at each renewal. After this they undergo the process of glazing, which consists in the same mechanical process, but instead of soap and emery a mixture of putty of tin and olive oil is substituted. They are next headed, and if they are intended to be blued are first scoured by either of the methods above described, but for blacking the scouring is not necessary; they are now blued or blacked.

Dress pins are made according to the last mentioned process, except that their heads are made of silver, or of brass, copper, and other metals and metallic alloys plated with silver.

PIERRE ERARD, of Great Marlborough-street, Middlesex, pianoforte maker to her Majesty, for *improvements in pianofortes*, March 24.—Claim first.—The sticker or elbow lever, as applied to the action of upright pianofortes, being mounted on an intermediate lever, together with the regulating screw and the rail by which it is supported, in order to effect the escapement of the sticker from under the hammer.

Claim second.—The damper, as applied to be actuated by the short end of the intermediate lever, which end is at the opposite side of the centre of that lever to that end which carries the sticker.

Claim third.—The construction and application of the plate and crank lever, for removing the newly contrived dampers from acting on the strings.

Claim fourth.—The metal connecting plates, for connecting the several horizontal rails of the action frame together, and the projection for connecting it with the key bed.

Claim fifth.—The ball and socket centre of motion for the finger key, with the lining of the mortice through the key, and the oval-shaped pin, applied on the top of the centre ball, in order to fill that lined mortice as it wears wider. Likewise the lining of the hole at the front end of the key.

Claim sixth.—The application and combination of the different parts of the action of the horizontal grand or square piano, and the action formed by so combining those parts.

Claim seventh.—The new brackets, and mode of fixing the metal string-plate on the wood-work of pianofortes, whether standing upright or horizontal.

Claim eighth.—The new frame for supporting horizontal square pianofortes, and obtaining an equal support by all their four feet, notwithstanding unevenness of the floor on which they stand, or want of flatness in the instrument.

The first part of this invention mentioned in the first four claims is applied to the "new upright oblique grand pianoforte," wherein the strings or wires, although disposed in a vertical plane, are stretched in a direction obliquely to the upright.

The sticker or elbow lever is mounted on an intermediate lever (mentioned in a former specification), and the escapement of one end of the sticker from under the hammer is effected by its other end coming in contact with a regulating screw, attached to a horizontal bar in the front of the action. The back end of the intermediate lever is prolonged upwards, so as to form a short elbow lever arm, that acts against the lower end of the damper, which is poised on a centre of motion sustained by the hammer rail. The whole of the dampers can be drawn back from the strings in order to effect what is called the "forte." It is done by the following means:—At the back of the lower ends of the dampers is a long horizontal plate or bar, suspended by hinges at different parts of its length, which bar can be forced against the lower ends of the dampers by means of a crank lever actuated by a pedal.

The horizontal rails of the action frame are connected together by several metal connecting plates, each of which has a projection formed on its lower end, which is attached to a piece of wood rising from the key-bed between two keys, which are cut away, so that it may not interfere with them.

The centre of motion of the keys is on the principle of the hemispherical ball and socket; the under part of the key being formed into a socket, and the pin on which it moves turned round so as to fit it. From this ball an oval-shaped pin rises, which enters a mortice in the key suitably lined, the smallest part of the mortice being smaller than the largest part of the pin, in order to prevent the key from rattling; the hole at the front end of the key is likewise lined for the same purpose.

The other part of this invention relates to horizontal square or grand pianos.

The hammers are in this instance placed horizontally, and the sticker is affixed to one end of the

intermediate lever, to the other end of which the damper wire is fastened, and between this and the centre of the lever is fixed the check. One end of the sticker abuts against the regulating screw, and the other end is formed into a stop or shoulder drop to support the hammer, being brought into its proper position after each time of acting by means of a spring.

The metal string-plate, in place of being screwed to the wood-work of pianofortes, as usual, is attached to it by means of brackets.

The new frame for supporting square pianofortes is similar to two Xs, placed on their sides one at each end of the piano, and connected together by a cross-bar. The lower parts are connected to the upper by two plates, one on each side, which turn a little on a pin passing through the upper part, by which means the frame is enabled to accommodate itself to any inequalities of the floor, or want of flatness in the instrument.

JOHN GIBSON and THOMAS MUIR, both of Glasgow, silk manufacturers, for *improvements in cleaning silk and other fibrous substances*, March 24. —The patentees claim the mode herein described of cleaning "silk-waste," and "silk-waste" combined with wool, hemp, or flax.

These improvements are brought into action after the silk has been converted into the form of the sliver or rove, and reeled into hanks. The rove when reeled into hanks is immersed in water until completely saturated; the hanks are then well wrung, which is most conveniently performed by an apparatus used by dyers called the "wringing post." The wringing is continued until the water ceases to flow, the hanks are then to be well "scutched" by the same apparatus.

The saturation of the silk with water, together with the wringing, has the effect of making the fine fibres of silk adhere to each other more closely, while the scutching, without disturbing the natural adhesiveness of the fine fibres, throws out or partially detaches the nibs and the coarse and unequal filaments of silk from the body of fine fibres, of which the rove is principally composed. The silk-waste is next dried and wound on bobbins,

The last part of the process consists in winding the silk on to fresh bobbins, during the performance of which it is brought, by means of a conductor, in contact with a revolving cylinder covered with cards, which detaches the remainder of the nibs, &c.

JOHN JOHNSTON, of Glasgow, Lanark, North Britain, gent., for *a method, by means of machinery, of ascertaining the velocity of or the space passed through by ships, vessels, carriages, &c., part of which is also applicable to the measurement of time*, March 24.—This invention consists in the application of what the patentee calls a suspended weight or secondary governor to the lever or balance immediately connected with a watch escapement, or to the balance of a chronometer; so that this weight by means of locomotion may increase the number of the vibrations of the balance, and thus determine the space passed through by any locomotive body.

The effect of this weight on the watch or chronometer, by the natural resistance of any body to motion, will be, that by two seconds being gained for one mile in respect to proper time four will be gained for two miles, &c.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(Continued from page 199.)

JOHN MAUGHAN, of Connaught-terrace, Edgeware-road, Middlesex, gent., for *certain improvements in the construction of wheeled carriages*, March 24.—This invention consists in the improved construction and mode of applying two pairs of shafts to that description of carriage generally denominated a "curricle," which are to be employed as a substitute for the pole and cross bar, commonly applied to a carriage of that description.

Each pair of shafts is connected together and kept firm by a horizontal bar, the middle part of which is held by clips, in which the bar turns as an axle, and the clips are connected to the body of the carriage by an upright pin extending therefrom, and passing through a socket in the scroll or bracket iron. The swing-tree is mounted on this upright pin by means of an iron socket attached to the centre of the swing-tree. The shafts are constructed of ash, and are ironed in the usual way throughout; the horizontal bars are attached to them by clips at their extremities, and the back part of the shafts are bent inwards or "compassed," and terminate in sockets, having a bolt-eye at their united extremities.

Under the seat of the body of the vehicle, a horizontal balance spring is placed transversely, mounted upon a short axle, affixed to the framing of the body, the outer end of which axle is supported by a pendant bolt; a loop, or bored coupling, connects the spring to the short axle, and allows it to vibrate and advance or recede thereon. From the ends of this spring two rods, having shackle joints at both ends, are pendant, for the purpose of connecting the spring to the ends of the shafts.

The patentee applies shields and a cross-plate to the two inside shafts, for the purpose of preventing one shaft from catching under the other, when the horses are in motion and approach each other.

Gig harness, having iron hook tugs, is to be used with the balance-shafts, and the inside shaft of each pair is padded out laterally on wooden chocks, leaving a niche for the hook tug; this padding is intended to support the covered and stuffed iron shields. One of the shields is furnished in its concave centre with an iron loop or staple, similar to that on the point of the hook-tug; through this staple the continuation of the back-band passes, and then through the loop of the hook-tug. The back-band thus attaches the shield to the hook-tug as an appendage, and when the horse is "put to" it holds the shield firmly in its place on the padding by being passed round the shaft in the usual way. This shield is all that is requisite for the one shaft, but the shield of the other shaft is shorter, and has an iron convex compassed plate, covered and stuffed, attached by a loose rivet across its centre. It is furnished with holes at both ends for small straps to confine it, above to the back-band, and below to the belly-band. The convex face of the upright compassed plate takes at right angles with, and on the convexity of, the horizontal shield on the opposite shaft, when the horses approach each other, thus preventing the shafts from obstructing each other's action, and at the same time protecting the harness from getting chafed. This short shield and cross plate has its loop or staple similar to the longer shield, and is attached to the hook-tug in the same manner.

A simple iron instrument is slipped on one extremity of the balance spring before commencing to "put to" the horses; it consists of a bar of iron slightly curved, having a fork near its upper end, and one at its lower end. The upper fork is applied to one end of the balance spring; and the top of the bar, at the same time abutting against the framework of the seat, has the effect of preventing that end of the balance spring to which it is applied from rising, but leaves the other end free to do so, by which means the lifted pair of shafts must bring up off the ground the sustained pair to a coincident level, which pair are free to be raised from that level, to admit of the second horse being brought into its place. The lower fork of the instrument, embracing the lower end of the pendant rod, prevents any horizontal action of the pair of shafts connected thereto.

ALEXANDER DEAN and EVAN EVANS, both of Birmingham, for *improvements in mills for reducing grain and other substances to a pulverised state, and in the apparatus for dressing or bolting pulverised substances*, March 24.—The patentees claim:—First, —The method of constructing grinding surfaces or plates with a plain or smooth portion in addition to the usual grinding surface of the plate, the use of the plain part surrounding the grinding part being to prevent injury to the grinding surfaces of the plates, by their being set too close together; and this plain portion of the grinding surfaces serves also to rub and comminute the substances which have not been sufficiently ground. They also claim the exclusive use of grinding surfaces or plates, formed of earthenware or porcelain, but they prefer the grinding surfaces or plates formed from similar materials to those used in fabricating the mortars well known as Wedgwood's mortars. The peculiar combination of materials of which the Berlin ware is composed also answers extremely well when formed into grinding surfaces, and they claim the exlusive use of grinding plates formed from such like materials. Metal grinding plates oxidize, and then give a bad color to those substances which are ground between them, they are therefore not adapted to grind salts which deliquesce, or loaf sugar, while the plates formed from the porcelain earths are not acted upon chemically, and have sufficient strength of cohesion to withstand the operation of grinding; the patentees claim the employment of such materia's in constructing large or small stones in lieu of French burrs.

Secondly,—As an improvement in apparatus for dressing or bolting pulverised substances, the use of a spiral brush, which, while it forces the pulverised substances through the interstices of the wire gauze trough in which it works, at the same time conveys or forces the substance to be dressed over the upper surface of the wire gauze trough, or forces it through the interstices of the gauze, thus obviating the necessity of placing the bolting or dressing apparatus in an inclined position. They also claim the dressing and bolting apparatus, constructed with a spiral brush, whether in combination with a mill or used as a separate apparatus.

These improvements in mills relate in part to that description called portable, and which were introduced by Napoleon Bonaparte into the French army.

The grinding plates are cut upon the surface in a similar manner to common mill-stones, and for a similar purpose, but in addition to the cut surface of the grinding plates, a portion of the outside circumference of each plate is a plain surface; so that the substance which has been coarsely pulverised by the "teeth of the plates," becomes still further comminuted, by afterwards passing between the two plain surfaces which are nearly in contact, and are only kept apart by the substance to be pulverised, and which escapes from between the grinding surfaces of the plates at their external circumferences.

These grinding plates are horizontal, the same as common mill-stones, in which they differ from the grinding surfaces of the French military mill, which were placed in a vertical position.

The grinding and dressing are performed simultaneously, or the dressing apparatus may be thrown out of use, and the mill used merely to grind or pulverise.

A series of wheels are used for giving a proper velocity to the grinding plates, and on the same axis as some of these wheels is a pulley which communicates motion by means of a band or gut, to the pulley that actuates the moving part of the apparatus for dressing pulverised substances.

The pulverised substance escapes from between the grinding plates at their external circumferences, and passes into a box beneath them. A brush fixed to the revolving grinding plate forces it out of this box through an aperture in its side; from this aperture it passes into the dressing apparatus (herein described), or when it does not require to be dressed, then the aperture is covered by a sliding plate, which is removed from the under side of the box, and by its removal an aperture is formed, out of which the grain or other substance passes from the mill, without going through the dressing apparatus.

The dressing apparatus consists of a trough of wire gauze, which is divided in its length into four portions; each of these portions of wire gauze vary in fineness, according to the desired quality of the meal, and in this trough, in contact with the wire gauze, a spiral brush revolves. The pulverised substance enters the trough through an aperture at

the top, and the spiral brush revolving on its axis forces the finest particles through the first portion of wire gauze. Then by the spiral direction of the bristles the particles are carried forward to the next portion, where the next finest particles are forced through, and so on to the last portion, where the coarser particles that will not go through the wire gauze are driven by the spiral brush out of the machine through an aperture formed for that purpose.

The patentee shows an apparatus for pulverising malt or other grain, where the object is to make as little meal or flour as possible. To effect this, the external edges of the plates are serrated or cut into teeth, and the grain as it passes between the two edges becomes coarsely pulverised.

Henry Pinkus, Esq., late of Panton-square, Coventry-st., but now of No. 36, Maddox-st., Regent-st., Middlesex, for *improvements in the methods of applying motive power to impelling machinery, applicable, amongst other things, to impelling carriages and vessels, and in the methods of constructing the roads on which carriages may be impelled*, March 24.—One of the improvements to which the patentee lays claim is what he terms the differential railway. It consists of a double line of railway, on which, at certain distances, is affixed a gas-explosive apparatus, described in the specification of a former patent obtained by him, provided with two large horizontal wheels, one above the other, round each of which an endless metal band passes; and between each apparatus thus described is an intermediate apparatus, provided also with a pair of wheels. The band proceeding from one of the horizontal wheels passes round one of the wheels of an intermediate apparatus placed in one direction, whilst the band from the other horizontal wheel passes round one of the wheels of an intermediate apparatus placed in the opposite direction.

The bands pass over wheels placed in the centre of each line of rails, and put those wheels in motion, which motion is communicated to the train of carriages by means of bars extending from the bottom of the same, and which are kept in contact with the wheels.

Another of the patentee's improvements is for a mode of propelling boats on canals by "gaso-pneumatic" power. Along the whole length of a canal, on one or both banks, a suspension rail is constructed, and along the canal, in a line with the rail, is laid down a gas main. On the rail is suspended an impelling machine, which consists of a frame running on wheels, and provided with two horizontal pulleys, round one of which an endless band passes from a pulley in the boat to be impelled, and in which is placed the gaso-pneumatic explosive engine. This engine actuates the pulley in the boat, which by means of the endless band communicates its motion to the horizontal pulleys, and they in turn communicate it to the running wheels, and cause the impelling machine to move onward and impel the vessel. Another mode of applying power on canals consists in using a steam-engine in place of the gaso-pneumatic engine, to give motion to the impelling machine; and in order that boats may travel in opposite directions with only one line of rails, the impelling machines are made to move over one another when they meet, and so proceed on their respective courses.

The following is a mode of constructing roads or ways, also included in this specification:—In a given area of land a station is erected in a central situation, in which is placed an electric battery or batteries; or wells or tanks are constructed in any part of the said area. From the station, or from any of the tanks, a system of mains or pipes are laid down, and all along these, at intervals of from one to two hundred yards, are erected short vertical branches, terminating in a box with a moveable lid. In the mains are laid continuous metallic wires, and these wires are so arranged that when their ends at the station or tanks are brought into contact with the positive and negative poles of a battery, they constitute metallic circuits.

In order to put implements into action by means of this power, the patentee uses a locomotive engine similar to that described in the former specification, except that the cylinders, piston-rods, and their appurtenances are dispensed with, and the drum may be of smaller dimensions. Round this drum is coiled a pair of wires, and these are attached to a similar pair in one of the boxes before mentioned. To the locomotive engine an electro-magnetic engine is applied, and, in order to set the former in motion, chemical action is induced in the batteries at the station or tanks, and electrical influence is thus generated, the force of which, acting through the metallic circuit, will put the impelling engine in motion.

The patentee uses the electric power to prevent the collision of trains on railways, by causing it to put the breaks of carriages into action; he also attaches an electric battery to the locomotive engine, so that when trains are approaching each other, the battery being brought into action will, by means of connecting wires, apply the breaks, pull the lever of the whistle, and shut off the steam.

The patentee also shows a mode of constructing engines, and of actuating them by means of electric power.

The electric power is also used for lighting railways, tunnels, roads, &c. An electric glow or "brush" is effected at the place required to be lighted, and being placed in the focus of reflectors, yields rays of light, which may be made revolving lights for night signals, &c.

In addition to the numerous improvements included in this specification, already noticed, there is one for a fire-engine to be worked by the "gaso-pneumatic power," to be drawn from the gas mains in the streets where the fire occurs, in the same manner as the water. [This specification occupies fifteen sheets of parchment, and there is also a corresponding number of drawings.]

Thomas Robinson Williams, of Cheapside, London, gent., for *improvements in the manufacture of woollen fabrics, or fabrics of which wools, furs, or hairs are the principal components, as well as for the machinery used therein*, March 24.—The patentee claims the application of a double apron or aprons, or compound aprons, and rollers or cylinders, for the production of bats, as herein described, from the long sliver, and the different means herein described for keeping these aprons together with the bats in a smooth and even condition; and he claims the extended sliver itself, as herein described, applied to forming a bat by successive folds or layers, for the production of long or commercial ends of cloth without spinning or weaving.

Also the improvement of the hardening machine, by using the heaters in addition to steam-pipes or pans, or in conjunction with a wetted apron, and using travelling aprons as herein described.

Also the improved positions of the rollers in the felting machine, for producing the double contact of each tier of rollers, and the combined reciprocating and progressive motion of these rollers, as well as the manner in which this motion is produced, as applied to the said felting machine; and also the method of diagonal or cross felting, as effected by the feeding rollers herein described, and also the method of producing long continuous fabrics of felt in a fit state for the common fulling stocks.

Also the raising machine, the diagonal positions of the raising cylinders, and particularly also the use of other or opposite revolving cylinders, whether covered with cards or any other material, for clearing raising cylinders whilst at work, as applied to the cloth manufactured by felting alone, or by the old method of spinning and weaving.

Also the use of soap or saponaceous matters dissolved in water, in conjunction with rollers, for assisting in the felting of fabrics made without spinning and weaving, in contradistinction to acids or acidulated waters, which have heretofore been used for fabrics depending for their union upon felting alone.

The patentee uses a common wool-carding engine for obtaining the bat, and to it are attached two long revolving aprons of linen cloth, one above the other, passing over four rollers or drums, which receive motion from the doffers of the card, or any other convenient part of the engine. These aprons and drums revolve in opposite directions, so that the two inner surfaces of each apron move in the same direction with uniform speed, and nearly with the same velocity with the doffers of the card as regards their surfaces. The wool is taken off from the doffers by the usual comb-crank motion in one attenuated sliver. This sliver is now received between the two revolving aprons, which have a slight flooring for their support, and passes on between them until it arrives at the farther end of the apron from the card; a direction is then given to the sliver so that it shall pass up and over the upper apron, and wind itself upon it, one sliver over the other, until the bat has become of sufficient thickness.

The bat is likewise produced from successive folds of the sliver, by several slivers being taken off from the doffers of different carding engines, and simultaneously received upon the same apron.

The aprons are prevented from wrinkling, and are kept uniformly and carefully extended, by the following means:—Upon the two edges of the apron are sewed cords or strips of leather, and against these cords or strips longitudinal guides or strips of wood are brought in contact by means of forked arms and set-screws, thereby preventing the apron from contracting.

The continuous bat having been obtained, as described, and received upon a roller, is taken to another machine called the hardening machine. The frame-work of this machine contains two sets of rollers, one over the other, each one being covered with an elastic cloth, and the lower set are furnished with a travelling apron. There are several steam-pipes connected with a boiler producing steam, placed between some of the lower rollers under the apron, which pipes extend from side to side of the same, and are finely perforated upon their upper sides, for the purpose of allowing steam to escape upwards for moistening and warming the bat of wool. The upper tier of rollers receive an alternating motion endwise by a cranked shaft running along the side of the machine, upon which there are as many cranks or eccentrics as there are rollers in the upper tier, having a slight throw of about half an inch, and connected with each upper roller by shackle-bars or slide-bars.

The lower rollers receive also a slow progressive motion from the main-shaft on the other side of the machine by suitable gearing. There is likewise inserted between these rollers and under the apron several heaters of hollow metal, connected by stop-cocks with the steam-pipes that furnish the perforated pipes with steam.

The roller with its bat is placed above this machine, and the end of the bat being entered between the first rollers is gradually passed through them, and by means of the alternating motion of the upper rollers acting against the resistance offered by the lower ones (which do not alternate), and aided by the moisture and heat, the bat arrives at the other end of the machine in a consolidated state, possessing a considerable degree of feltation. Here it is again wound upon a roller, and taken away to receive the next operation.

The patentee likewise shows another apparatus for manufacturing coarse wools or hair, part of which is similar in construction to the improved ordinary "devil." The hardening of the bat is effected by upright wooden beaters with smooth rounded ends.

Another apparatus is used in manufacturing coarse descriptions of goods, which is similar to the above, except in the mode employed for hardening the bat, which is effected by passing it between the outer surface of a cylinder and hardening rollers placed around its periphery.

The felting machine has a double tier of rollers, the upper resting between the lower ones, so as to double the points of contact. These rollers are all actuated by bevil gear upon alternate ends of the upper tier of rollers, which turn the lower ones by spur wheels upon their opposite ends, connected with similar gear upon two shafts extending the whole length of the machine on each side, and these two side shafts are again connected with each

other by similar but stronger gear upon the cross main shaft. Each set of upper rollers is weighted upon the lower ones, which are placed in a box or cistern lined with lead, and containing a supply of soap and water. An upper and lower apron are used for conducting the bat through the machine.

The object of the apparatus connected with the main-shaft is to give the two tiers of rollers a reciprocating motion, and at the same time to allow the bat, alternately pressed and liberated between their inner surfaces, to have a forward direction through the machine. After passing through this, it is placed in the entering end of another similar felting machine, but instead of being entered as before, it is first passed between a pair of feeding rollers, which are placed at an angle of 45 deg. with felting rollers, by which means the cloth is acted upon across its width in a slanting direction, and so obtains a more perfect texture.

Another process is used with some materials, which consists in winding an apron of soaped cloth round a roller between the folds of the bat, before placing it on the common fulling stocks.

The improvement in the raising machine consists in placing the raising cylinders in a diagonal position, and close beneath each of them is placed a smaller revolving cylinder covered with cards, which constantly act to clear the teeth of the cards on the raising cylinders whilst the same are at work.

JAMES LEE HANNAH, M.D., of Brighton, for *improvements in fire escapes*, March 25.—Claim first.—The manner of connecting together the sections or portions of the ladder as described.

Claim second.—The application of the remover as described.

Claim third.—The application of the elevator.

Claim fourth.—The application of the revolving poles.

Claim fifth.—The application of the safety box.

The patentee does not claim any new parts, but merely the new application of old ones.

The ladder consists of sections of five and ten feet long, which are connected together by eye-plates, eye-bolts, &c. The usual length of the ladder for ordinary use is stated to be sixty feet, consisting of three lengths of ten feet, and six lengths of five feet, and when raised a short and long length is placed alternately. At the upper and under part of the highest section (ten feet in length), two inches from its end, the axle for the wheels of the ladder is applied, and from the round part of the axle a flat iron hook is suspended by three or four links of a chain. This hook is intended to grapple the safety-box, when that box is drawn up as high as the hook.

The skeleton or frame of the elevator somewhat resembles two pair of dividers or compasses connected together at the top, opened, and the legs separated from each other, three connecting bars being let into each pair of legs. It is made of ash, and is six feet and a half long. The legs are connected at the top by a hinge with a cut in it, in which a pulley turns. The side of the elevator next the ladder is boarded up from the bottom to the top; this boarding is to keep the lower end of the ladder in a proper line during the progress of its elevation until a section be added to it; at the other side of the elevator a crank is applied, and under each of its legs is a well-pointed spike. The elevator is likewise provided with a hook (attached by a rope to the crank), which runs down the boarded part; the elevator is placed nearly parallel with the ladder, and the hook is applied to the under spoke of the same, then by turning the crank the hook brings up the section with it, the boarded part of the elevator keeping the ladder in a proper direction.

When the ladder is elevated sufficiently high, the long bolts of a section to be added are introduced into the eyes of the upper section, then by gradually letting the crank turn back, the section last added will come down and rest firmly on the ground. A repetition of this process admits of the application of as many five feet sections as may be required.

The patentee uses a "lifter" for raising the ladder from the ground, a description of which is not necessary as he makes no claim to the same.

The remover is made of ash, and is seven feet in length; it is made by connecting two pieces of that wood parallel to each other, by means of two staves either of ash or oak; its upper part is provided with a pair of wheels. To both sides, and on the upper surface of the inner end of the remover an iron plate is fastened, which is formed into a hook to receive a spoke of the ladder, and the bottom of the hook is provided with a spike that enters the ground.

The revolving poles are of ash, varying from five to eighteen feet or more in length, and at the lower end they resemble a pitchfork with two prongs.

To the upper end of the pole a plate of iron is fastened, which curves downwards, and to each end of this curved plate a piece of iron with a "throat" is forged; this throat resembles a pair of sugar tongs cut off in the middle; these are intended to receive a spoke of the ladder. To the opposite end of the pole a similar plate of iron provided with "throats" is fastened, but the curve is in an opposite direction to the other, and to each end of it a straight line is attached.

The following is the mode of using this fire-escape:—The ladder is first extended to a sufficient length, and the sections connected; the hooks of the remover are then passed under the lowest spoke, and its handle depressed until the ladder rests on the spikes. The spikes of the shortest revolving pole are then "jammed" against the stonework of the railings of the house, the men at the same time depressing and "shoving forward" the remover for the purpose of bringing the axle of the ladder wheels against the throats of the pole. This being done, the lifter is applied between the sides of the ladder for its hook to take hold of the third spoke from the axle. The crank of the lifter is then turned, when the ladder will begin to rise. As it rises the pole begins to revolve with it, and takes it as high as the railing. This action of the pole results from the power of the men applied at the end of the remover. Another pole is applied to catch the weight of the ladder before the first one comes to a perpendicular; this second pole is to bring the wheels of the ladder in contact with the walls of the house; when this is effected, the ladder is raised to its destined height by continuing the depression and "shoving" at the handle of the remover. The ladder being thus applied, the safety-box is put on and drawn up, for persons to get into it at the window or the top of the house.

In a lane where the remover cannot be used, the lengthening of the ladder must be performed in the manner before stated.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 5th of June.

Francis Pope, of Wolverhampton, engineer, due May 24.

John Haughton, of Liverpool, clerk, M. A., due May 24.

Henry Charles Daubeny, Esq., residing at Boulogne, due May 25.

Thomas Barratt, of Somerset, due May 25.

Junius Smith, Esq., of Fen-court, Fenchurch-street, due May 25.

Charles Grellett, of Hatton-garden, due May 25.

William Henry Bailey Webster, of Ipswich, surgeon, due May 25.

Oliver Louis Reynolds, of King-street, Cheapside, merchant, due May 25.

Nathaniel Baths, of Manchester, engineer, due May 25.

Frederick Theodore Philippi, of Bellfield-hall, calico printer, due May 25.

Robert Roberts, of Bradford, blacksmith, due May 25.

Henry Walker Wood, of Chester-square, gent., due May 25.

Edward Henshall, of Huddersfield, carpet manufacturer and merchant, due May 26.

Miles Berry, of Chancery-lane, patent agent, due May 27.

John Clay, of Cottingham, York, gent., and Frederick Rosenborg, of Sculcoates in the same county, gent., due May 27.

John Condie, manager of the Blair Iron Works, Ayr, Scotland, due May 27.

George Holworthy Palmer, of Surrey-square, civil engineer, and Charles Perkins, of Mark-lane, merchant, due May 28.

George Blaxland, of Greenwich, engineer, due May 28.

FOREIGN PATENTS.—BELGIUM.

LIST OF PATENTS RECENTLY GRANTED BY THE BELGIAN GOVERNMENT.

(*Continued from page* 86.)

C. J. de Mat, a patent of invention for 15 years, for *a process of neutralising the effects of snow, frost, and rime on the rails of railroads*, Jan. 15, 1841.

Ch. James Harvey, represented by Dethy, a patent of invention for 10 years, for *certain improvements in paving streets, roads, and ways with blocks of wood, and in the machines and apparatus used for cutting and forming such blocks*, Jan. 15, 1841.

Richard Prosser, represented by Urling, a patent of invention for 15 years, for *an improved method of making buttons and other articles of the materials used in the manufacture of porcelain, earthenware, and bricks*, Jan. 15, 1841.

Sebastien Botturi, a patent of invention for 15 years, for *machines and processes for felting vegetable or animal fibrous substances, in order to manufacture therefrom hats, blankets, cloth, carpets, and other stuffs*, Jan. 15, 1841.

Ad. Le Hardy de Beaulieu, a patent of invention for 15 years, for *a machine for extracting ores and raising water from mines by means of endless vertical ropes*, Jan. 15, 1841.

Deschiros, a patent of importation and improvement for 5 years, for *a new description of wigs and toupets on tulle*, Jan. 15, 1841.

Pierre Joseph Durieux, a patent of invention for 5 years, for *a subterraneous goniometer to be used instead of the compass in mines in which there are magnetic substances, or on railroads*, Jan. 16, 1841.

F. Bon, a patent of invention for 15 years, for *an apparatus applicable to the condensers of steam-engines working in a vacuum, and condensing by external cooling*, Jan. 16, 1841.

Benjamin Winkles, represented by Dethy, patent of invention for 10 years, for *improvements in the construction and arrangement of flood-gates and water-wheels*, Jan. 16, 1841.

Matthieu Louis Mueseler, a patent of improvement for 15 years, to date from the 15th Sept. 1840, for *improvements in the colliers' lamp* (for which he obtained a patent the 15th Sept. 1840), Jan. 16, 1841.

F. Nollet, a patent of invention for 15 years, for *a new application of electro-motive power*, Jan. 19, 1841.

L. Bourguignon, son, F. Dupont, and V. Lion, represented by Colson, a patent of invention for 15 years, for *machinery for sawing marble blocks into*

slabs, for forming round tables of such slabs, for ornamenting marble, wood, and metals with various mouldings, for adjusting various pieces of marble, &c., Jan. 19, 1841.

Jean Baptiste Ligny, a patent of invention for 10 years, for *a new mode of uniting flat or round cords*, Jan. 19, 1841.

A. M. Timbrell, a patent of improvement for 10 years, to date from the 12th of Nov. 1840, for *improvements in the process of propelling vessels, &c.* (for which he obtained a patent the 12th Nov. 1840.)

Pierre Bossard, a patent of invention for 15 years, for *a new mode of scaffolding, and a crane of new construction*, Jan. 31, 1841.

E. G. Brabant Lemielle, a patent of invention and improvement for 10 years, for *a process of soldering metals by their fusion alone, without the aid of other substances*, Jan. 31, 1841.

James Hancock, represented by Delianson Clark, a patent of invention and improvement for 15 years, for *an improved method of raising water and other fluids*, Jan. 31, 1841.

Louis Seresia, a patent of improvement for 10 years, to date from the 13th Nov. 1840, for *improvements in the economical heating apparatus* (for which he obtained a patent the 13th Nov. 1840), Jan. 31, 1841. The term of the patent granted the 13th Nov. 1840, to the aforesaid Seresia, is prolonged for 10 years.

F. T. De La Roche, a patent of invention and improvement for 5 years, for *a new kind of chimney, with moveable hearth*, Jan. 31, 1841.

Robert Soden, of Birmingham, represented by Doré, a patent of importation for 5 years, to date from 17th Nov. 1840, for *improvements in the cylinders, planks, and blocks used in printing and gaufering or embossing cotton, flax, woollen, silk, and other similar tissues*, Jan. 31, 1841.

Count de Fontaine Moreau, of London, represented by Vautier, a patent of importation for 5 years, for *a new pendulum level*, Jan. 31, 1841.

Auguste Francotte, a patent of importation and improvement for 5 years, for *a hanger, sabre, or poignard pistol, with one or more barrels*, Jan. 31, 1841.

William E. Newton, represented by Prisse, a patent of importation and improvement for 5 years, for *improvements in printing presses*, Jan. 31, 1841.

John E. Lee, of London, represented by Dixon, a patent of importation for 5 years, for *a new rotary steam-engine*, Jan. 31, 1841.

Henri Steven, a patent of invention for 15 years, for *a machine for raising water to any required height by atmospheric pressure*, Feb. 3, 1841.

J. S. Guillemin, a patent of invention for 10 years, for *a new mode of draining, effected by pumps, called by the inventor "semi-auto-motrices,"* Feb. 4, 1841.

E. S. Rottermund, a patent of invention for 15 years, for *an economical apparatus for heating apartments*, Feb. 6, 1841.

G. Hoorickx, a patent of importation for 5 years, for *the manufacture of a new fuel called carboleine*, Feb. 6, 1841.

Henri Steven, a patent of improvement for 15 years, to date from the 3d Feb 1841, for *an improvement in the machine for raising water* (for which he obtained a patent the 3d Feb. 1841), *and which improvement consists in substituting condensed steam in place of the pneumatic pump*, Feb. 14, 1841.

Charles Dewitte, a patent of invention for 15 years, for *a globe for the purpose of increasing the intensity of light*, Feb. 14, 1841.

F. B. Loret Vermeersch, a patent of invention for 5 years, for *a process of adapting the expressive organ to the common one*, Feb. 14, 1841.

John Fellows, represented by Dixon, a patent of invention for 15 years, for *new combinations in the construction of steam-engines*, Feb. 14, 1841.

George Taylor, a patent of invention for 15 years, for *an improvement in the mode of carding hemp, tow, wool, and other fibrous substances*, Feb. 14, 1841.

Claude Goutard, a patent of invention for 15 years, for *a new manner of producing particular effects of light and perspective by means of colored glasses, methodically arranged*, Feb. 14, 1841.

Jacques Joseph Gilain, a patent of invention for 15 years, for *a new safety valve and fire-box for preventing the explosion of steam-engine boilers*, Feb. 14, 1841.

Robert Urwin, represented by Urling, a patent of invention for 15 years, for *improvements in steam-engines*, Feb. 14, 1841.

L. F. Vanshauwenberge, son, a patent of invention for 5 years, for *a new economical process of brewing beer of a more agreeable and vinous taste than is obtained by ordinary methods*, Feb. 14, 1841.

P. Mortier, sen., and L. Mortier, jun., a patent of invention and improvement for 10 years, for *a machine for clearing the rails of railroads from rime and snow, and obstructions generally*, Feb. 14, 1841.

E. Delvaux, represented by Miraux, a patent of improvement for 10 years, to date from the 12th May 1840, for *improvements in the machine called carde-filo-finisseuse* (for which he obtained a patent the 12th May 1840).

FOREIGN INTELLIGENCE.

FRANCE.

M. Verusmor, of Cherbourgh, in a letter addressed to the Academy of Sciences, at Paris, announces that on Thursday, the 25th of February last, about three o'clock in the afternoon, a flaming meteor from the N. E., fell upon the roof of a vine-press, situated in the hamlet of Bois-au-Rouse, in the commune of Chauteloup, in the arrondissement of Constance, and set fire to it with a rapidity that could be compared only to the explosion of fire-works. An instant afterwards the house of the owner of this press, and an adjoining house likewise, became a prey to the flames. The three habitations were reduced to cinders. This event took place in the day-time, and may be alleged as corroborative of a fact which M. Arago was the first to announce, that the fall of a meteor may set fire to buildings.

The deficiency in the revenue of France to meet the increasing expenditure of late years presents a formidable amount. The actual deficit on the year 1841, after taking into account the set-off of surplus revenues in the estimates of former years, amounts to 102,265,000 frs.; the deficit of 1840, to 183,765,000 frs.; and the deficiency of preceding years to 256,000,000 frs. This makes a total deficiency to be provided for of 542,000,000 frs., which is about equivalent to £21,680,000. The estimated deficiency for 1842, amounts to 77,916,000f., in addition to the above. The extraordinary expenses for the fortifications of Paris and other warlike preparations are not included in the preceding. Altogether it is estimated that the actual deficiency to be provided for by loan or otherwise will amount to not less than £56,000,000, sterling.

BELGIUM.

The *Moniteur Belge* of Sunday publishes a report made to M. Rogier, Minister of Public Works, on the reform in the British Post-office, and its application to Belgium, by M. L. Bronne. This report fills 26 columns of the *Moniteur*. The report gives a summary history of the English Post-office to the present time. The result, he says, is certainly not calculated to encourage any Government to follow their example, yet he thinks it possible to make Belgium enjoy the indisputable advantage of the system. He recommends a uniform rate, increasing with the weight, and he has set out with the idea that the revenue is to remain equal to what it now is; and proposes modifications in the administration of the Post-office, by which great saving of expense will be effected, and this, added to the expected increase in the number of letters, will, he thinks, effect the end proposed.

We are informed that government has authorised the Liége steam navigation company on the Meuse to establish a temporary yard on the shore of St. Barbe, for the purpose of building the steam vessels that this company proposes to substitute for other vessels that are unable to navigate the river in dry weather. This erection will commence immediately, so that we hope to see this navigation adopted during the course of the present year.

RAILWAY INTELLIGENCE,

DOMESTIC AND FOREIGN.

London and Greenwich Railway.—The new works of this line are progressing rapidly. About 370 men are employed. Twenty-three piers are raised up to the springings of the arches, and about 100 more are in progress.

Opening of the Great North of England Railway.—This great undertaking, which has now been completed from York to Darlington, was formally opened on Tuesday, and on Wednesday was fully opened for the regular conveyance of passengers and merchandise. The completion of the work was on Tuesday celebrated by great festivities. A train left Darlington in the forenoon for York, containing about 500 shareholders and their friends—a luncheon was given by the directors of the York and North Midland Railway, in their new refreshment-room, which on this day was also first opened: a public dinner took place in the evening at the King's Head Inn, Darlington, and along the entire line hundreds of persons were congregated, who hailed the trains with hearty huzzas. The distance, 45 miles, of nearly level road, was performed in the afternoon by a special train placed on the line for the convenience of Mr. Joseph Pease, M.P., in one hour and forty minutes—the ordinary time occupied in the journey will, it is expected, be about two hours. The day was fine, and not a single accident occurred to mar the pleasures of the occasion.

North Midland Railway.—By a new regulation, which came into operation during the past week, third class carriages are now attached to all the trains, with the exception of the mail trains. The quantity of minerals conveyed along this railway is almost outstripping the accommodation at the disposal of the company; but this inconvenience will easily be remedied. Very considerable additions to the traffic may be expected from the Clay Cross collieries and coke works, which were on an extensive scale; the latter will moreover afford the company the means of obtaining coke at a much lower cost than heretofore, and so be productive of a material saving in the annual expenditure. Mr. Stephenson's lime-kilns also at Amber-gate are likely to supply to a great extent the midland counties with an article of great value in agriculture; the lime which is found in those counties being inconsiderable, and of inferior quality. We understand that the company's superintendent was at Darlington last week, making arrangements with the directors of the Great North of England Railway for rendering the facilities for travelling from one line to the other as complete as possible. The number of trains running daily on the North Midland is 59, and will in a few days be 63. Between Leeds and Manchester there are 18 passenger trains; from Leeds and Manchester to Brighouse, 2; between Leeds and London, 10; Leeds and Derby, 2 (will be four); Leeds and York, 8; Leeds and Hull, 9; these, with the two between

Sheffield and Hull, and about ten luggage trains on the line, make a total of sixty-three daily.—*Sheffield Iris.*

London and Edinburgh Railway.—The report of the Government engineers on the different competing lines between London and Edinburgh, presented to the House of Commons, but not yet printed, states that the preferable line is a continuation of the London and Birmingham, Grand Junction, and Lancaster and Preston Railways, by Carlisle, Gretna, Lockerby, Beatock and Crawford, to Symington, in Lanarkshire; and from this point by two diverging lines to Edinburgh and Glasgow,—Symington being about thirty miles distant from each city. From Symington to Edinburgh two alternate routes are proposed; one by Biggar, Linton, and Penicuik; the other by Thankerton, Wilsontown, and Mid-Calder. The route by Linton is the shortest by a mile; but, from the nature of the ground, that by Wilsontown is considered preferable. The line by the north of the Pentland range, besides being a much easier line, runs through a more productive mineral district than the one by Linton, on the south of the Pentlands; but the point of divergence commands both sides of that range, as well as both sides of the Clyde. The *Edinburgh Observer*, in noticing the Report of the Commissioners, observes—"it is a curious fact, that it appears to have been by this line, and also from a similar point in divergence, that the Roman armies marched from England to both the east and west of Scotland; and from near the same Roman station diverges the great Parliamentary road, executed by the late Mr. Telford, under the Government Commissioners for improving the communication between England and Stirling, and the north of Scotland."

Reduction of Fares from Manchester to London.—There is now a competing line of railway from Manchester to London. The directors of the Grand Junction have had their own way for a long time, but the tables are now turned. At the very time that they were paying a dividend of 12½ per cent., they actually raised the fares about 6 per cent. above what they had been. The directors will soon find out their mistake. The Leeds and Manchester line is now open throughout, and to the credit of the directors, they have made such arrangements with the directors of the North Midland and the Midland Counties, as enable them to take third class passengers the whole distance from Manchester to London for 21s., and second class passengers for 32s.; being from 20 to 30 per cent. lower than the fares paid hitherto.—*Preston Chronicle.*

Extraordinary Railway Speed.—We understand that arrangements have been made to carry passengers from London to Liverpool by the fast trains, very shortly, in six hours and a quarter.—*Railway Times.*

The Taff Vale Railway.—Every exertion is making at the Merthyr terminus to get the projected buildings erected, that all may be ready for the day of opening, which cannot be far off now.—*Merthyr Guardian.*

That part of the Carlisle and Maryport Railway between Oughterside Colliery and Aspatria is progressing rapidly, and is expected to be opened on Easter Monday. The traffic in coals in that part already opened is at present immense, the "Ellen" making six trips every day.—*Carlisle Journal.*

Opening of the Greenock Railway.—Monday two locomotives with twelve wagons loaded with coke arrived at the terminus, direct from Glasgow. At Paisley the arrival of the trains was hailed with cheers, and on arriving at Bishopton the workmen and villagers turned out, and welcomed the unexpected visitors by tremendous cheering. The trains in coming over the line were stopped on every arch, and thus tried the stability of the works. The first train ran over the whole line of the railway the very day that the stupendous and magnificent water-wheel of the cotton-mill performed its first revolutions. On Wednesday the line is to be open to the public.—*Glasgow Chronicle.*

Proposed Railway to Inverness.—The Magistrates and Town Council of Inverness have addressed a memorial to the Government, earnestly pressing on its attention the importance of extending the railway system of internal communication to the Northern Highlands of Scotland, of which that borough is the capital, and praying that means may be at least provided out of the public purse for defraying the expenses of an engineering survey, to ascertain the railway capabilities of that district of country.

Railroads in Ireland.—The following appears in a late number of the *Cork Reporter*:—"We feel ourselves fully in a position to state—indeed, we may say, authorised to announce – that the formation of a line of railroad, southwards from Dublin, will be soon undertaken, and that, from the arrangements and agreements which have been made, the delays attendant upon Parliamentary notices will be obviated, so as to enable the work to be commenced long before it could be if these forms were to be observed. The funds are to be supplied by three great London capitalists, with whose names we are acquainted, and whose immense wealth is indisputahle. The terms upon which they contribute them are also communicated to us, and all the difficulties which were interposed by Sir Robert Peel and his party in the year 1839, against the Government making a grant or advance—they insisting that the work should be carried on by private enterprise—are met and conquered by the present arrangement, Government being in the meanwhile so mixed up with it that all its aid will be thrown in. It would give us great satisfaction if, in making this announcement, we were enablod to state, that it was intended in the first instance to undertake the railroad all through to Cork; but at present the work is only contemplated to extend to Holy Cross, in the county of Tipperary, the extension to Cork and Limerick to be postponed till after the completion of the first work."

RAILWAY ACCIDENTS.

Bursting of a Boiler.—On Wednesday night an accident occurred to the luggage-train of the Great Western Railway. The train left the Paddington station at half past 9 o'clock, and when it had proceeded between five and six miles, it was discovered that one of the tubes of the boiler had burst, and the engine was no longer able to work. After upwards of an hour's hard labor the train was backed to Paddington, when, after a further delay of more than three hours, it again started on its journey. When the accident was discovered, the guard immediately returned to the station to have workmen in readiness to repair the engine, as from the lateness of the hour, and there being no fires, it was impossible to obtain a fresh one.

Accident in Rescuing a Child.—One day last week Mr. John Briggs, formerly a gamekeeper to the late Earl of Durham, was standing near to the Fatfield station of the Stanhope and Tyne Railroad, and, seeing a child in danger of being run over by a train of coal-wagons, he rushed forward to snatch it from impending destruction. He succeeded in that object; but one of his feet getting fast below the lip of the rail, he could not get himself clear before the train came and passed over his leg, mangling it so dreadfully that amputation was necessary.—*Tyne Pilot.*

Fatal Collision on the Manchester and Leeds Railway.—An engine driver named Innes was killed on the above railway on Friday last, in consequence of his engine coming into collision with a luggage train. It was entirely his own fault, and a verdict exculpating the company has been returned by a coroner's jury.

Accident on the Blackwall Railway.—On Wednesday morning, as the West India train on its way to town had reached within about eight or ten yards of the roller upon which the rope is coiled, the rope snapped in two, and six or seven yards of it which had not reached the roller swung about with a force which threatened destruction to everything within its reach. The conductor of the train, observing the danger, used every effort in his power by means of the break to stop the train, to prevent its coming within reach of the rope, but, finding this impossible, he went right on, and passed over the roller, intending by this means to get beyond the reach of danger on the left side of the wheel. Unfortunately he was not enabled to do so, and the train stopped in such a position that the end of the broken rope in its evolution struck the hindmost carriage with such violence three or four times as to do it considerable injury, but at length the engine was stopped, and further mischief was prevented. Seven or eight passengers who were in the carriage that was injured got out with great alacrity the moment the train stopped, and thus escaped injury. The rope was "spliced," and in about twenty minutes the train was able to travel on the north line.

Jumping from a Railway Train.—When the five o'clock down train was proceeding, on Thursday evening, between Duffield and Belper, the hat of a man, dressed in a smock-frock, and riding in the third-class train, blew off; in spite of all that the other passengers could do to prevent it, the man jumped out of the carriage to recover his hat. The train was travelling at the time at the rate of thirty miles an hour. The shock the man received on touching the ground did him such serious injury that it is doubtful whether he will recover.

Reported Fire on the Grand Junction Railway.—A correspondent of the *Morning Post* states that a fire, which has consumed goods to a great amount, took place last week on the Grand Junction Railway, occasioned by sparks falling from the chimney of the engine upon the goods.

FOREIGN RAILWAYS.

Traffic on Railways in Germany.—From a return published in the journal *l'Alsace*, it appears that the traffic on the principal lines of railway in Germany, during the month of last January, was as follows:—

	Distance in kilometres.	Travellers.
From Vienna to Brunn about	96	7,423
From Munich to Augsburgh	80	8,293
From Leipzic to Dresden	112	13,566
From Francfort to Mayence	34	16,331
From Leipzic to Magdeburgh	120	16,521
From Berlin to Potsdam	23	21,301
From Furt to Nuremberg	7	26,288
From Manheim to Heidelberg	22	5,096
Total	495	114,729

Paris and Meaux Railroad.—The bureau of the Chamber of Deputies has taken into consideration the Paris and Meaux Railroad Bill. The road is to be established along the right bank of the canal de l'Ourcq, as far as Meaux, crossing the canal St. Denis. Meaux is a great market for supplying Paris, and the daily number of persons passing to and from the towns is estimated at 700. The contractors, to whom the railroad company have transmitted their rights, are Messrs. Gouge and Daugny. The grant is for 80 years, at the expiration of which the property of the line will be annexed to the canal de l'Ourcq, which is vested in the city of Paris in perpetuity. The bureau in general seemed inclined to favor the undertaking.

Railroads in Ireland.—We feel ourselves in a position to state—indeed we may say, authorised to announce—that the formation of a line of railroad, southwards from Dublin, will be soon undertaken; and that, from the arrangements and agreements which have been made, the delays attendant upon parliamentary notices, &c., will be obviated, so as to enable the work to be commenced long before it would be if these forms were to be observed. The funds are to be supplied by three great London capitalists, with whose names we are acquainted, and whose immense wealth is indisputable. The terms upon which they contribute them are also communicated to us; and all the difficulties which were interposed in the year 1839 against the Government making a grant or advance are met and conquered by the present

arrangemeı t, Government being in the mean while so much mixed up with it that all its aid will be thrown in. It would give us great satisfaction, if, in making this announcement, we were enabled to state that it was intended, in the first instance, to undertake the railroad all through to Cork; but, at present, the work is only contemplated to extend to Holy Cross, in the county of Tipperary—the extension to Cork and Limerick to be postponed till after the completion of the first work.—*Cork Southern Reporter.*

Effects of Railways.—There is, perhaps, no town in the kingdom where trade has suffered to so great an extent as that of Egham, through which, before the Great Western and Southampton Railroads were opened, between seventy and eighty long stages passed during the day. For some time past only one coach, the North Devon, has proceeded through the town, and that, it is stated, will be "off the road," and finally cease running, on Monday next. Several of the inns are entirely closed. Inns which formerly let for from £100 to £150, and more, per annum, may now be had for less than thirty and forty pounds for the same term. The contemplated railroad from Staines to London has been entirely given up by the parties who projected the undertaking.

TO CORRESPONDENTS.

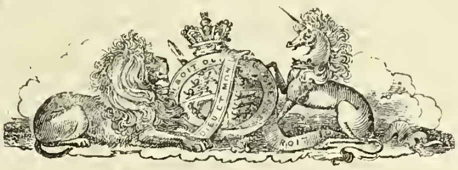
"A Constant Reader," *who writes from Manchester, recommends as a precaution against accidents on railways, that telegraphs should be placed at certain distances along every line, connected by wires, which, in case of accident or detention, might be pulled by the guard to give a signal of danger to trains following or in advance. The other suggestions of our Correspondent, have been previously recommended; and one of them, that of providing lanterns to be used as signals by the guards on the trains, is, we believe, generally adopted.*

Zeta *will find an article on the question he alludes to, in No.* 80 *of the* "Inventors' Advocate."

Gratuitous Copies *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"The Inventors' Advocate" *is published every* Saturday Morning, *at* 7 o'Clock; and is regularly issued in Monthly Parts, of which 1 *to* 22 are now Ready.

"The Inventors' Advocate" is also published in Volumes, containing the Nos. of every 6 months.



THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, APRIL 3, 1841.

The committee appointed by the House of Commons to investigate the present unsatisfactory system of paper currency have not yet finished their labors, but it is confidently stated that the determination they have formed, from the evidence already adduced, is to recommend the establishment of one national bank of issue, which alone should have the power of making paper money. Whether or not this be the conclusion to which the committee have arrived, after their long pending investigation, we conceive the same might have been readily deduced from a consideration of the well-known injurious effects of the existing anomalous state of the currency, without the addition of such facts and opinions as are to be gathered from the examination of witnesses generally more or less personally interested in the decision.

There is no subject of more importance in a manufacturing community than the regulation of the currency which is to serve as a measure of the value of commodities at different times; and yet it has been left, for the most part, without any guidance by the government. The plan of leaving the manufacturing and commercial affairs of the country to govern themselves, in all matters not relating to taxation, has indeed been far too much adopted, and the government has by this means neglected what is really, for the public welfare, its most important functions. The currency is one of those subjects that have been allowed to adjust themselves without control, until the injurious effects of the want of regulation have forced the legislature or the government to endeavor to apply a remedy. The remedies however that have been hitherto proposed, are of the petty, tinkering kind, which, not being formed on any general principle, were the mere creations of circumstances. The calamities that were from time to time produced by the unlimited issue of notes by country bankers, seemed to point to paper money as the source of the evil; and the tendency of modern legislation has, therefore, been to check its issue, and to establish a currency founded on a metallic basis. Thus as the manufactures, the commerce, the population of the country have increased, the legislature have contracted the means by which all business transactions are effected, and cramped the energies of trade, by endeavoring to place the currency on an impossible basis, at a time when more extended accommodation was required.

In the hasty and narrow-viewed legislation that succeeded the monetary crises that showed the fallacy and instability of the system of paper currency then existing, no measures were brought forward that could effectually guard against their recurrence. All bank issues that are payable on demand in gold are hazardous, inasmuch as they make the issuers either depend on public credit, or oblige them to keep a useless stock of bullion to meet any sudden demands that may arise from want of confidence, originating possibly from the most unfounded rumors. In the present state of the currency, therefore, there is no one bank that in case of panic is not liable to be run upon for gold; and when any commercial embarrassments arise, the banks, instead of giving assistance to those who require it, are obliged to contract their issues to place themselves out of danger. By this means the public confidence, which, if timely supported, might be preserved, becomes completely shaken, and in the midst of the convulsion that ensues there is no succouring or regulating hand that, free from danger itself, can afford aid to others.

By the establishment of one national bank of issue, which we have before advocated, most of the evils of the present system of paper currency might be avoided, and a great saving effected by the diminution of the amount of bullion which the Bank of England is now obliged to keep to meet any unexpected demand.

The notes of a national bank would rest upon the credit of the nation; and so long as that remained unimpaired, the notes would maintain their value. Were all the issues confined to one bank alone, the directors would then be able to regulate the circulation to the wants of the country, and a perfect control over the whole could be maintained. The control at present exercised by the Bank of England is ineffective, as the efforts made by that establishment to regulate the circulation may be rendered inoperative by the numerous other banks of issue in the country. The operations of the Bank of England are, also, guided more with a view to the interests of that great trading concern than to the general interests of the country, even allowing it had the power to regulate the circulation to the wants of the community. This ought not to be. The paper money of the country as much requires to be under the sole control of the government as the coin issued from the Mint. In that case, most of the fluctuations and embarrassments that now arise from the unregulated and unprotected state of the currency would be avoided, and if commercial panics should then occur, there would exist a stable bank, which, being free from danger itself, would be able to render assistance when required, and restore the confidence and trade of the country.

NEW INVENTIONS.

SOUNDING THE SEA BY ELECTRO-MAGNETISM.

Electricity is daily extending its sphere of operations, and is becoming more and more extensively applicable to useful purposes. We have this week seen an ingenious apparatus contrived by Mr. Bain, the inventor of the electrical clock, for the purpose of taking soundings at sea by electro-magnetic power. At present great difficulty exists, when taking soundings in deep water, in ascertaining the exact time the weight strikes the ground. The object of Mr. Bain's contrivance is to obviate this difficulty, and he accomplishes it in the following manner. To the bottom of the hammer of a bell is attached a piece of soft iron, which is placed opposite an electro-magnet; and it is so arranged that when the communication between the coils of wire round the magnot and galvanic battery is completed, the magnet attracts the iron and holds back the hammer. As soon as the connection is broken the magnetic power ceases, and the hammer, acted on by a spring, strikes upon the bell. This part of the apparatus is intended to remain on the deck of the vessel when the soundings are made. The insulated wires from the galvanic battery, properly protected from the action of water, serve for the cord to which the weight is to be attached. The manner in which the weight is fixed on, so as to complete or break the connection between the ends of the wires is extremely simple and ingenious. When the pressure of the weight bears on the hook, the electrical current is uninterrupted, and the magnet keeps the hammer from the bell; but when the weight rests on the ground, the connection is broken; the attraction of the magnet instantly ceases, and the hammer, being thus liberated, is forced against the bell by the spring. It would thus indicate with the utmost precision the moment the weight reaches the bottom of the sea. The apparatus is to be added to the numerous curiosities at the Polytechnic Institution. Its efficacy has been tested in the deep reservoir in which the diving bell descends. The inventor has been prevented from protecting his property in this invention by the expense of obtaining a patent, but we trust, if his plan be found to succeed in practice, of which we have little doubt, that he will not go unrewarded.

PROTECTIVE HARNESS SADDLE.

A patent has recently been granted for a new kind of harness saddle, for the protection of horses from rain and cold. This saddle contains within it a waterproof cover, which can be drawn out at pleasure, and is so arranged that the driver, while on the box, can either draw it out or cause it to disappear within the saddle. This is effected without the aid of a spring, therefore the mechanism is not liable to get out of order. The covering, when drawn out, entirely protects the animals from wet, and would also prevent them from taking cold when standing, after having been driven. The saddle itself, with the covering enclosed, is not much more bulky than a common harness saddle, and combines an appearance of elegance with great utility.

NEW MODE OF CLEANING PRINTING TYPES.

The *Faanl* mentions the discovery, by M. de Rottermund, of a new process of cleaning printing typso and copper-plates, which promises to be very advantageous. The use of the potash of commerce in washing the letters by rubbing them with brushes dipped in a ley of that alkali, is very injurious to the type. That method of cleaning them is also far from being effective, for on examining the composition of printing ink, and knowing the chemical and physical properties of those substances, it is easy to perceive that even caustic potash would be insufficient, without the addition of some mechanical means to effect the removal of the portions of ink which sticks to the letters. This is still more the case when the potash of commerce is used, which is a carbonate mixed with wood ashes, sand, and other substances unfit for such a purpose. In the process of M. de Rottermund, the use of brushes in the cleaning of types is superseded. The chemical agents he employs to produce that effect are also cheaper than those hitherto used. The most important part of his process, however, consists in being able to clean the type without brushes, and by this means he preserves the letters from the rapid destruction to which they are at present subject owing to that method of cleaning.

PORTER AND CO.'S PATENT ANCHORS.

One of the most interesting experiments, and one which cannot fail to prove of immense advantage to the navy, and the merchant service, took place on Monday in the presence of Captain Phipps Hornby, C.B., superintendent of Her Majesty's Dockyard, Woolwich, and a number of nautical gentlemen. One of Porter and Co.'s patent anchors having been previously placed on the testing frame, an immense power was applied by an hydraulic machine invented by Bramah and Son, and the anchor weighing 5 cwt. 2 qrs. 24 lb., which would have been considered safe according to the adopted test of $8\frac{5}{8}$ tons, actually sustained additional strains until it reached $20\frac{1}{2}$ tons before it gave way under the application of that immense power—nearly $2\frac{1}{2}$ times greater than would ever be required under ordinary circumstances. A second anchor, weighing 5 cwt., was afterwards placed on the testing frame, and the power having been applied, it sustained a strain of $21\frac{1}{2}$ tons, given by jerks, before it gave way, although it would have been considered perfectly safe if it had stood $8\frac{1}{4}$ tons. There was another anchor by the same patentee on the spot, of still larger dimensions, but the experiments with the other two were so satisfactory that it was not found necessary to prove its capabilities. It appears strange, and yet it is evidently the fact, that the more simple the construction of any article is, there is the greater certainty of its success. The principal difference betwixt this anchor of Porter and Co., and those at present in use, is a projection on the outside of the fluke, which enables it to catch hold of the most difficult ground, and ensures its obtaining a firm hold and double power by the upper fluke descending on the shank, and acting as a fulcrum in the most effectual manner. By the kindness of Captain Denham, of the Marine Surveyor's department, we have been enabled to give the following details of the advantages of this anchor.—"It is almost impossible to foul it. It bites quickly into the most stubborn ground. It holds on the shortest stay peak. It cannot well lodge on its stock-end. It presents no upper fluke to injure the vessel herself or others in shoal water. It cannot injure vessels' bows when hanging cock-bill, as merchant vessels find a convenient practice. It is not so likely to break off an arm or part in the shank as anchors with fixed flukes do, because the construction of these arms can be of continuous rod-iron, and the leverage is so much nearer the ring, owing to the pea of the upper ring closing upon the shank. It is a most convenient anchor for stowing on board, on a voyage, as the flukes can be easily separated, and passed into the hold; it can as easily be transported by two boats, when one would be distressed with the whole weight. Several of the officers who witnessed the experiments stated their intention of applying to the Admiralty for anchors on this construction, as they were so satisfied of their advantages."—*Times.*

A DOG-MILL.

An account of a mill worked by dog power is given in the *Alsace* of Strasburgh. We confess the description of the amount of work performed approaches the marvellous. It is said that a native of Strasburg, named Muller, has invented a simple and cheap machine, set in motion by the force of a single dog, turning like a horse in a mill, whereby a stone in its roughest state is in five minutes cut into a regular shape fit for building, and its faces have an unusual smoothness. This machine is capable of working twelve stones in an hour, or 144 in a day of 12 hours—being equal to the labor of 40 men employed for the same time. Muller (adds the journal) possesses several quarries of stone, both hard and soft, and works his mill daily in the presence of numerous spectators.

(To the Editor of the Inventors' Advocate.)

Sir,—Your paper of the 27th inst. contains a statement that on Saturday afternoon, William Turner expired at Westminster Hospital, in consequence of injuries received the previous morning whilst at work at my mills.

I must request you will please to contradict the same, as I am happy to say, that no accident *whatever* has taken place upon my premises, or ever did, to occasion loss of life, since their establishment by the late Mr. G. Smart, nearly forty years ago. I am, Sir, yours obediently,

Lambeth, March 30, 1841. G. Smart.

[The paragraph was copied from the daily papers.]

SCIENTIFIC CORRESPONDENCE.

RECIPROCATING AND CRANK ACTION.

To the Editor of the "Inventors' Advocate."

Sir,—As you argue occasionally, in my opinion, erroneously, I would address you more frequently if I had time, but I generally trust to some person more competent than I am to perform the task. You have argued very ingeniously, but upon a fallacy, about the loss of power in the craok of steam engines, and from the stopping of motion of the beams of reciprocating engines.

In your last "Advocate," (No. 86,) Mr. Ham gives to me a satisfactory reply; but you continue to doubt if the motion of the beam, or its momentum, be completely stopped before a new stroke of the engine commence. If Mr. Ham again replies to you, I doubt not he will add what I am going to do, which is, that the prevention of the loss of power from a reciprocating motion depends upon *the crank being connected to a large fly-wheel.* If no fly-wheel be attached to a crank, or to the shaft upon which it is fixed, you would be perfectly correct in saying there would be a great loss of power; and if a large beam were attached to *merely a crank,* as soon as it turned to one of the "*dead points,*" *all* motion would cease, and the momentum of the beam would be driven into the axle of the crank, and be completely lost, as much as if the end of the beam had struck a rock. But if a fly-wheel be attached to the crank, the *momentum* of the beam *goes into the fly wheel;* and this can easily be proved from the nature of the crank, seeing that after it revolves half distance between the dead points the motion of the beam *gradually diminishes,* and is altogether stopped when either of the dead points is reached.

If no fly-wheel be affixed, the motion of the beam would *not be gradually stopped,* and *the crank would move faster* as it approached the dead points, from the point where the leverage is greatest, and merely because no fly-wheel *prevented* the *uniform* motion of the beam. I am confident you could satisfy yourself upon this matter, if you experimented with a beam and crank, with and without a fly-wheel, and you would find what I assert to be correct. Perhaps you will say the momentum of the fly-wheel *causes* a continued alternate motion to the beam, but that still the said beam is neutra-

lisiug and diminishing the momentum of the fly-wheel. If this be the case, a fly-wheel should run longer on its axis when *disconnected from* than when *connected with* a beam, or for a greater number of revolutious.

Suppose I take a fly-wheel, and turn it till it revolves at a velocity of sixty times per minute, it will revolve a certain number of times before it stop from friction. It matters not what we suppose the number of revolutions to be, so we may say it revolves 300 times and then stops. If I now attach a crank to a beam (and the heavier the better for my purpose, though a proportion between the beam and fly-wheel more beneficial than another will exist), and suppose tho fly-wheel attached to the axle of the crank, and if again I bring up the revolution of the wheel to sixty times per minute, and then stop my moving power, I assert that the wheel will now continue *longer in motion than before* (instead of *shorter*, as your argument would conclude), because I put a *greater body of matter in motion*, and of course, as it would take more power to set the fly-wheel and beam in motion at the rate of sixty revolutions per minute, so will it take longer time for the momentum generated to expend itself in friction, and therefore the wheel will likely revolve 400 times before it stops,—or say 300 times again, as the friction of the beam may neutralise the addition to the first power.

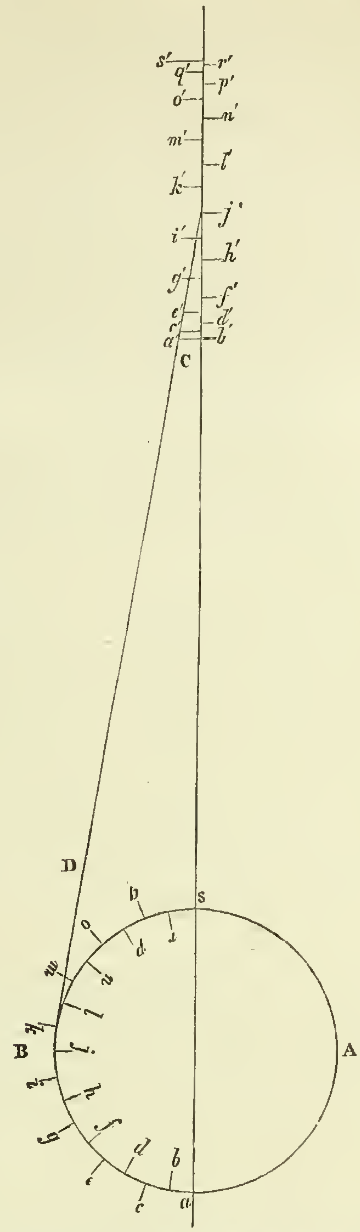
You may say that in steam-boats there are no fly-wheels, and hence a loss of power from the reciprocating action. You must notice that the want of a fly-wheel is compensated to a great extent by *heavy gearing*, and by the paddles, which act as fly-wheels from their momentum to some extent, but act further in steadying the motion from their immersion in the water, so that the momentum of a beam or piston is greatly stopped before the crank reach the dead point, because the paddles are kept almost at a uniform velocity from their dipping iuto the water. These two things—*viz.*, momentum of wheels and gearing, and dip of paddles in the water, prevent any loss of power from reciprocating motion in steam-boats.

As Mr. Ham is to endeavor to correct your ideas regarding "crank motion," I will not enter upon it, aud I doubt not you will by-and-by become convinced that the crank is a mechanical contrivance capable of transmitting power without loss, other than mere friction on its bearings.

Edinburgh, 22d March, 1841. Your's, &c., A Subscriber.

To the Editor of the "Inventors' Advocate."

Sir,—I note your remarks on my second letter on reciprocation, and beg to state in reply, that I have been treatiug that subject abstractedly. I do not consider that it is attended with any loss of momentum, and therefore does not require any adjusting or compensating mode of employing the steam; whatever economy might result from working steam expansively goes entirely to the credit of that system, and is a subject quite distinct and independent of reciprocation; moreover, could you prove that reciprocation occasions a loss of momentum, no alteration in the mode of employing the steam would prevent it. Suppose, for instance, that instead of admitting steam into the cylinder, the engine were to be driven at the same speed by a power applied to the crank-shaft, (the cylinder being open at the top and bottom, or dispensed with), could not the *whole* of the power so employed be accounted for in friction, and the loss arising from the angular action of the connecting-rod? If so, my position is admitted. If not, I should like to be informed how any excess of momentum arises after the stroke is finished. This question would be rather difficult to determine experimentally, and I merely advance it in order to define how, independent of every other consideration this question of reciprocation ought to be discussed. Let us clearly define and settle our question first, and should you feel disposed to have my opinions on the other subject, I shall have much pleasure in placing them at your disposal. The following is a solution to this question of reciprocation, which is best conveyed by means of a diagram.



Let A, B, be the circle described by the crank; C, D, the connecting-rod; a, b, c, d, &c., segmeuts of the circle equal to ten degrees, and a′, b′, c′, d′, &c., the respective spaces through which the top of the connecting-rod passes vertically. It is very manifest that these spaces *increase* until the crank arrives at the half-stroke, and *decrease* in the same proportion to the termination of the stroke. Assuming that the crank revolves at a uniform velocity, these spaces become a correct measure of the velocity of the top of the connecting-rod for every ten degrees passed by the crank, and consequently (when multiplied by the weight) of the amount of momentum attained. It must also be obvious, that re-action is very slowly imparted to the reciprocating parts, and increases until half the stroke is completed. The moment, however, that *that point is passed*, velocity decreases, and consequently, not only is no additional momentum given to the moving parts, but whatever is acquired is, from the retardation, brought into active operation, and both theory and practice will bear me out, that whatever momentum is imparted in the arcs ab, bc, cd, &c., is absorbed, and acts as an additional power to that of the piston, in the opposite arcs sr, rq, qp, po, &c.; hence, as I have before stated, the *whole* of the momentum acquired in the first quadrants is advantageously employed in the others. You will perceive that this motion bears a closo analogy to that of a ball running down one curve and up another, or of a pendulum; and you will also admit, I think, on a close examination of the diagram, that motion could not well be *imparted* or *withdrawn more gradually* than is effected by the crank; no other apparatus that I am acquainted with can at all compete with its action in this respect, and is, so far, the best that can be employed.

With respect to there being no loss of power by reciprocation, when the steam is worked at full pressure, I do not think that my letters can convey such an opinion. I wish particularly to separate that and other questions from the loss of *momentum* by reciprocation, which you have described as being so enormous.

I am, Sir, your obedient servant,
Norwich, March 23, 1841. F. Ham, C. E.

[We have replied generally to the preceding letters in our first article, but there are some remarks in the letter of "A Subscriber," which, as they do not refer to the general question, could not be there commented on, and yet ought not to pass unnoticed. We consider his opinion that the paddle-wheels of steam ships act as fly-wheels, to be fouuded in error. The resistance of the water to the floats of the paddle-wheel is, we conceive, at all times greater than any momentum which the wheels possess, and would be sufficient to stop their motion almost immediately were it not for the impulse of the vessel. The momentum of the vessel moving in the water may tend to equalise the motion of the engine, and thus serve the place of a fly-wheel; but the action of the double crank of the two engines, acting at right angles, is the principal means of compensation, and serves to carry the crank past the dead points.]

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING APRIL 5, 1841.

Monday	Entomological Society	8	P.M.
	United Service Instit.	9	P.M.
Tuesday	Linnean Society	8	P.M.
	Horticultural Society	3	P.M.
	Civil Engineers	8	P.M.
	Architectural Society	8	P.M.
	Uranian Society	8	P.M.
Wednesday	Society of Arts	7½	P.M.
	Geological Society	8½	P.M.
	Astronomical Society	8	P.M.
Thursday	R. Soc. Literature	4	P.M.

Easter recess commences.

ROYAL INSTITUTION.

March 26. Friday Evening Meeting.

Mr. J. F. Goddard, the gentleman engaged by the patentees to work the process, delivered a lecture "On the Application of the Daguerreotype to the taking of Likenesses from the Life;" which is accomplished by Wolcott's reflecting apparatus, and is secured by patent. It is hardly two years since it was announced in Paris that M. Daguerre had made a most wonderful discovery, by means of which he was enabled to fix tho images and pictures obtained in the camera obscura, and thus produce by the action of light designs in which the objects preserve their forms with the strictest mathematical precision, even to the most minute

details. The extraordinary interest and curiosity which this announcement created not only in Paris, but throughout Europe, and in England more particularly, is generally known. Nor was this curiosity and interest in the least diminished or disappointed when the secret of the process was made known. For such was the extraordinary accuracy with which every object in nature was copied—the perspective represented—the most delicate gradations of line and shadow brought out; the faithfulness of the representations as a whole; to say nothing of the singular novelty of the process by which these beautiful effects were produced, that it became the all-absorbing subject of attention at the time.

The vast importance of this discovery in the arts and sciences was easily seen, and the resources and facilities that it would afford in their study were incalculable, so much so, that a bill for rewarding its authors, M. Daguerre and Niepçe, was proposed by Louis Philippe, and adopted by a special commission charged with its examination, on condition that the secret was published for the benefit of the *whole world*. But strange as it may appear it is a fact recorded by Daguerre himself, that whilst M. Duchâtel, the Minister of the Interior, was urging upon the Chamber of Deputies as reasons why this extraordinary and liberal measure should be adopted by them, that "unfortunately for the authors of this beautiful discovery it was impossible for them to bring their labour into the market, and thus indemnify themselves for the sacrifices incurred, *as the invention did not admit of being secured by patent*."

At this very time, Niepçe, after obtaining Daguerre's sanction, which was done only with very considerable delay, was actually contradicting this statement of the Minister by commissioning an agent in Londou to take out a patent for this country. The consequences of which have probably not been very satisfactory, as it necessarily put at once a check to anything like speculation here; but not so in other countries. To America is due the honour of having first successfully applied the discovery to the taking of portraits from the life. The apparatus by which this is done has been patented in this country by Mr. Beard, a gentleman who has spared no expense in bringing it to perfection; but the invention being a communication from a foreigner residing abroad, viz. Mr. Wolcott, of New York, and consisting in very important improvements in Daguerre's process, it is proposed to substitute a name better suited to the principles of English nomenclature, than that of Daguerreotype, which, although a favorite word on the Continent, is by no means suited to our views, and has no reference whatever to the principles of the subject; the patentees have therefore adopted the term *Photography*, which signifies that the pictures are produced by the action of light.

The various means that have hitherto been adopted, and the more recent improvements enumerated, were the principal points entered on by the lecturer in treating the subject, the details of which were the following:—

Images of objects may be obtained in two ways; by refraction through a lens, and by reflection from a mirror. Mr. Goddard then proceeded to describe the camera as originally constructed by Daguerre, and also the minutiæ requisite to be attended to, in preparing the plates, on which the image is to be reflected. The plates used are made of copper, silvered on one side only, the purer the silver the better—as the effect depends to a very great extent on the perfection of the polish and the uniformity of their surfaces. To prepare the plates for the camera (after the polishing has been effected) they are gently washed over with dilute nitric acid, the proportion as suggested by Daguerre answering the purpose, viz. one part of acid to 16 parts of water; this solution is gently and uniformly applied to the polished surface by means of a piece of cotton moistened with it;—the plate is afterwards wiped quite dry by using several pieces of dry cotton; finely divided pounce (sifted from a linen bag) is distributed over the surface, and rubbed also with cotton: this process Daguerre recommends to be performed three or four times. This completed, the plate is exposed to the vapor of iodine, in a box for the purpose; in a short time the surface becomes coated with a pale yellow or golden tinge, and is then fit for the camera. The operator then removes it in the dark, and introduces it by means of an apparatus into the place previously occupied by a plate of ground glass, on which the reflection had been properly adjusted according to focus. After it has remained in the camera for a given time, depending on the power of the light, it is removed and exposed to the vapor of mercury (heated to about 690 degrees Fahr.) in the mercurial box. From this it is placed in a trough, and the surface covered or washed with a hot and weak solution of the hyposulphite of soda, which permanently fixes the object. All that which we have just described must be performed in the dark, and constitutes the process originally made use of by Daguerre and Niepçe. It is not altogether applicable for taking portraits from the life.

It is to Mr. Wolcott, an optician of New York, that the world is indebted for the working out of the idea of taking portraits from the life; who having speculums at hand was led to experiment with them on a plaster bust, and he succeeded beyond all expectation on the first trial, the plate having been exposed in the instrument only five minutes; the diameter of the speculum first used was about seven inches.

To procure the silver plates then became a matter of some little difficulty, after all those of French manufacture had been used. Mr. Johnson adopted a method by which he obtained good sur faces; and this he accomplished by plating to some thickness silver on copper, and polishing the surfaces of two pieces as high as it was possible. He then applied the *two* polished silver surfaces together, and had them passed between the rollers of the rolling mill; after the pieces had been reduced to the proper degree of thickness, the surfaces of both the plates were found to possess a polish far superior to that obtained in the usual way. Mr. Goddard considers that the plates manufactured at Birmingham, under the superintendance of Mr. Johnson, are equal to those procured from Paris.

The process now adopted to finish plates so prepared, is to use, instead of pounce, finely-divided tripoli, after the dilute nitric acid; this ought to be done just before it is used, otherwise if prepared long before, the air appears to have some peculiar effect on the surface, the rationale of which is not altogether understood. Finely-divided *rouge* and *charcoal* applied on *black velvet* are the materials used to finish up the polish, which gives it a dark hue; so much of the effect of the picture depending on the depth of shade produced.

A bust was then taken by the oxy-hydrogen light in the space of three minutes. The time formerly required by the old process was about five or six minutes in the middle of the day; but with the more recent improvement of Mr. Goddard (we believe the *iodide of bromine*) he is enabled to take likenesses in the space of from two or three seconds, to one and a half, or two minutes.

So many effects are produced of a varied character, by the mode thus adopted in preparing the plates, and almost every result may be obtained that the artist may desire, some of them resembling even the style of Rembrandt, &c., &c.

As it is necessary that the individual to be taken should sit in as strong a light as possible, it has been found expedient to glaze the sky-light in front of which he sits, with deep blue glass; by this arrangement the light is moderated to a considerable degree, enabling those of weak sight to bear it without inconvenience; and the blue glass also performs a part of some importance in the process, by transmitting the *chemical* rays, and obstructing to a certain extent the *luminous* rays.

In conclusion he considered that the invention as now practised would prove serviceable to artists, and especially miniature painters, as it would enable them to flatter their patrons, at the same time retaining the character so as to give a correct likeness.

The lecture announced for the next meeting was Mr. Brayley, "On the Geology of the Moon."

CHEMICAL SOCIETY OF LONDON.

March 30. *Professor Graham, in the Chair.*

In accordance with a circular issued to the different chemists and amateurs of the science in the metropolis, inviting them to attend on the 30th of March, to establish the society—the meeting took place and was well attended. The report of the provisional committee was read, and the different articles put to the members *seriatim.* This led to much discussion, and a few trifling alterations in the original report took place, which was ultimately unanimously adopted. The secretary announced, that 74 gentlemen had expressed a desire to join the society, 45 being resident, and including the names of the most distinguished practical chemists in Great Britain. It is proposed to form two classes of members—*Members* properly so called, including men who have prosecuted the science with zeal and research, and who will be required to pay an annual subscription of £2: the other class, *Associates*, will not have to pay any fees; and will include a great number of young gentlemen pursuing chemistry as a science, such as pupils, managers of manufactories, &c.

It was resolved, that the meetings of the society should take place on the *second* and *fourth* Tuesdays in the month during the session, from November to May, inclusive, at the rooms of the Society of Arts, John-street, Adelphi, the chair to be taken at eight o'clock, P.M., precisely. The following gentlemen were then elected officers:—Professor Graham, *President*; Messrs. Brande, J. T. Cooper, Daniells, and R. Phillipps, *Vice-Presidents*; Mr. Arthur Aikin, *Treasurer*; and Mr. Robert Warrington, *Secretary*.

The president stated, that he had received a communication from Liebig, containing some new facts, which would be read at the next meeting. The same author, in conjunction with a chemist of Prague, have promised the society a paper "On the Atomic Weight of Carbon." Letters have been received from various eminent continental chemists, promising to support the society with their co-operation. Three ordinary members were proposed and several associates. The meeting then adjourned.

LONDON ELECTRICAL SOCIETY.

A special general meeting was held on the 24th ult., at the reading-room of the Royal Gallery of Practical Science, Adelaide-street, Strand. The chair was taken by E. Johnson, Esq., A.M.

Several members addressed the chair, with observations upon the condition and prospects of the society, and suggested such alterations as they deemed most conducive to the interests of the society and the science it was formed to cultivate. It seemed to be the general opinion, and it was so determined, finally, that the public meetings of the society should in future be held on the third Tuesday of each month; that at these meetings should be read, in full or in abstract, all communications made to the society; that these communications should be printed and published on the 1st day of July, October, January, and April; and that a sufficient number of each quarterly part should be printed to enable the secretary to furnish them to the public at such a price as may be deemed necessary.

The thanks of the meeting were voted to Martyn Roberts, Esq., for a paper of observations upon the organisation of the society; also to Charles Walker, Esq., for his great services to the society.

Mr. Walker was requested by vote unanimously to continue an honorary secretary, and to become treasurer pro tem.; to take such steps as he shall judge most advisable for the arrangement of the meetings of the society and of the publication of the proceedings; and to report at the end of twelve months generally the result of the new arrangements, the members present engaging to lend him every assistance in carrying them into effect.

Thanks were voted to the chairman, and the meeting adjourned.

CAUSE OF THE PRODUCTION OF DAGUERREOTYPE PICTURES.

The April number of the *Philosophical Magazine*, just published, contains the following communication from Mr. Martyn J. Roberts, on the cause of the effects of the Daguerreotype:—

"Although the Daguerreotype process has long excited intense interest in the scientific world, we have not as yet had an explanation of the wonderful effects produced. I believe that even M. Arago has failed to elucidate the theory; and not only has this great philosopher been foiled, but the inventor of the process is unable to solve the problem. With these facts before me, I feel it almost presumptuous in so humble a votary of science as myself to attempt an explanation of the cause of the production of Daguerreotype pictures; but if my attempt has the effect of directing attention to the right path of arriving at a solution of the question, I shall be satisfied. We all know that light has a powerful influence on crystallisation; solutions that will not crystallise in the dark instantly form on the admission of light; the crop of crystals is always more copious on the enlightened side of a glass containing a crystallising liquid than on the dark side. Ice forms more rapidly during moonlight, and on the break of day, than on a dark night. But I need not adduce examples of the influence of light on crystallisation, for the fact is allowed by all scientific men.

"Let us then suppose, that in the Daguerreotype process the cleansed silver plate is exposed in the dark to the vapor of iodine; this deposits itself in a flocculent or powdery state on the plate, unable to form the peculiarly shaped iodic crystals, from the absence of light; but yet all other requisites being present, it may be considered in an incipient state of crystallisation, or balanced so finely that the admission of the excitant light instantly throws it into plate-formed iodic crystals, but only in those parts where the light has impinged, and here its perfection of, or continuity of, crystallisation, is merely in proportion to the intensity of light.

"Having now the iodated plate removed from the camera obscura, where it has undergone a surface crystallisation, more or less perfect in those parts where the lights and shades have fallen, we submit it to the mercurial vapor; the atoms, vesicles, or globules of this vapor being very minute, attach themselves to all the minute inequalities of face in the iodine; on those parts which are fully crystallised the vapor is precipitated on the flat tabular surface of the crystals, and here offering a continuous and equal angle of reflection to the eye it appears white and resplendent. On the non-crystallised or imperfectly crystallised surface of the iodine, which being in a measure powdery, and offering no determinate angle of reflection to the eye, the mercurial vapor adheres, but in no flat surface or continuous determinate angle capable of reflecting a mass of light; it may be said it is here unpolished.

"Again, may not the angle under which it is necessary to view a Daguerreotype picture be that of the facet of the iodic crystal, and this be a further confirmation of my theory? The mercurial vapor covers the whole of the iodine, and thus protects it from the further action of light.

"Such are the crude views I have formed on this subject, and I trust they may lead to a further elucidation."

GREEN TEA MANUFACTURE AT ASSAM.

BY MR. C. A. BRUCE.

About three pounds of the fresh leaves as soon as they are brought in, are cast into a hot pan (sometimes they are kept over night when abundance have been brought in, and we have not been able to work all up); they are then rolled and tossed about in the pan until they become too hot for the hand. Two slips of bamboo, each about a foot long, split at one end so as to form six prongs, are now used to tumble and toss the leaves about, by running the sticks down the sides of the pan, and turning the leaves up first with the right hand, then with the left, and this as fast as possible; which keeps the leaves rolling about in the pan without being burnt—this lasts about three minutes; the leaves will then admit of being rolled and pressed without breaking. They are now taken from the pan and rolled in dollahs, much the same as the black tea, for about three minutes, in which process a great quantity of the juice is extracted, if they be fresh leaves; but if they have been kept over night, very little juice can be expressed from them in the morning, on account of its having evaporated. The Chinamen say this does not matter, as it makes no difference in the tea. The leaves are then pressed hard between both hands, and turned round and pressed again and again, until they have taken the shape of a small pyramid. They are now placed in bamboo baskets or dollahs, with a narrow edge, and the dollahs on bamboo frame-work, where they are exposed to the sun for two or three minutes; after which, these pyramids of tea are gently opened and thinly spread on the dollahs to dry. When the tea has become a little dry (which will be the case in from five to ten minutes if the sun be hot) it is again rolled, and then placed in the sun as before; this is done three successive times. But should the weather be rainy, and there is no hope of its clearing, all this drying is done over the fire in a small drying basket, the same as the black tea. The green tea-makers have as great an aversion to drying their tea over the fire as the black tea-makers. The third time it has been rolled and dried, there is very little moisture left in the tea; it is now put into a hot pan, and gently turned over and over, and opened out occasionally, until all has become well heated; it is then tossed out into a basket, and while hot put into a very strong bag, previously prepared for it, about four feet long, and four spans in circumference. Into this bag the tea is pressed with great force with the hands and feet; from 14 to 20 lbs. being put in at one time, and forced into as small a compass as possible. With his left hand the man firmly closes the mouth of the bag immediately above the leaves, while with his right hand he pommels and beats the bag, every now and then giving it a turn; thus he beats and turns, and works at it, tightening it by every turn with one hand, and holding it with the other, until he has squeezed the leaves into as small a compass as possible at the end of the bag. He now makes it fast by turns of the cloth where he held on, so that it may not open, and then draws the cloth of the bag over the ball of leaves, thus doubling the bag, the mouth of which is twisted and made fast. The man then stands up, holding on by a post or some such thing, and works this ball of leaves under his feet, at the same time alternately pressing with all his weight, first with one foot then with the other, turning the ball over and over, and occasionally opening the bag to tighten it more firmly. When he has now made it almost as hard as a stone, he secures the mouth well, and puts the bag away for that day. Next morning it is opened out; and the leaves gently separated and placed on dollahs, then fired and dried until they are crisp, the same as the black tea, after which they are packed in boxes or baskets. In China the baskets are made of double bamboo, with leaves between. The tea may then remain on the spot for two or three months, or be sent to any other place to receive the final process. This first part of the green tea process is so simple, that the natives of Assam readily pick it up in a month or two.—*Madras Journal*, 1839.

SCIENTIFIC MEMORANDA AND NOTES ON ART.

The Marquis of Northampton's Soirée.—The Marquis of Northampton, as President of the Royal Society, had a *conversazione* on Saturday night at his mansion in Piccadilly. Prince Albert honoured the Noble Marquis with his company, the Prince, having being elected a fellow of that learned society shortly after his arrival in this country last year. Owing to the anticipated visit of his Royal Highness, the attendance of fellows and visitors invited was unusually numerous, upwards of 500 members being present. Prince Albert arrived at a quarter past nine o'clock, and was received by the Marquis of Northampton and the members of the council in the vestibule, and was thence conducted to the saloon. As the royal visitor came earlier than expected the greater portion of the company had not arrived. At half past ten the Noble Marquis's rooms were crowded, indeed so much so that the grand staircase was thronged with company. The tables in the three saloons and ante-rooms displayed many scientific models, and several beautiful specimens of the mineral kingdom; among others an enormous sardonyx brought from India, the largest in this country, and a piece of green jasper from Camby, in Gazerat, in the East Indies. Dr. Mantell submitted to the assembly a fossil fish, with the stomach, from the chalk of Lewes, and microscopical sections of tufts and bones of the iguanodon. Mr. White and Mr. Charles Pritchard also exhibited fossil infusoria from the flints of Clapham. A pair of warbling grass paroquets (*Melopsittacus undulatus*), from the interior of Australia, was exhibited by Mr. Gould. On one of the tables was an earthenware vessel (Roman), found this year, four feet under the bed of the Thames, near Westminster-bridge. Several pictures obtained by the Daguerrean process were submitted, and excited general attention. It was a very interesting meeting, and Prince Albert seemed highly gratified by the visit. His Royal Highness retired at eleven o'clock. On taking his departure the guests formed into a line on each side from the staircase to the doorway, and on the Prince passing to his carriage he courteously acknowledged their respect by repeatedly bowing.

Royal Botanic Society, Regent's Park.—A meeting of fellows was held at the society's garden on Saturday, Sir G. T. Staunton, Bart., in the chair. After the reception of some valuable donations from the Royal Botanic Garden, Dublin, and from Sir Thomas Acland, Bart., a ballot took place for new members. During the present month considerable progress has been made in the formation of the garden, and it is expected that by the end of April they will be available to the subscribers.

Zoological Society.—A very full meeting of members was held this week, William Yarrell, Esq., V.P., in the chair. The report of the council announced the balance in hand at the last report £1,258 6s. 3d., and the receipts of the past month at £1,074. There had been expended £651 19s., and the present balance was £1,690 8d. 3d. The number of visitors to the gardens in March was 7,397, from whom £199 8s. was received. The only presents of importance were an agama and two racoons, from the president, the Earl of Derby. Pursuant to the bye laws, the secretary read the proposed list in the change of members of the council who were to be elected at the ensuing anniversary meeting, on the 29th inst. The names proposed to be removed were the Rev. John Barlow, Professor Bell, Sir John Boileau, Bart, Chas. Darwin, Esq., and Sir Philip Grey Egerton, Bart.; and those suggested for election in their place were the Hon. C. A. Murray, Sir Robert Heron, Alexander Milne, Esq., and Messrs. Hearne and Pole. Colonel Acklom was also proposed a member, in place of the Right Hon. Frankland Lewis, who had resigned; and Mr. Gould, J. E. Grey, Esq., and Mr. Newman were recommended for election on the committee of publication. There was also an important alteration confirmed relative to the business of the anniversary meetings, which declared that on those occasions no business should be transacted, except as relative to the election of officers and council, and reading the usual reports. This modification of one of the bye-laws was ballotted for and carried unanimously. The meeting adjourned till the anniversary, which will be held on the 29th inst.

Ruins of Palatay.—At a late meeting of the Geographical Society an interesting paper was read, communicated by Lord J. Russell, containing an itinerary of a journey of Lieutenant Caddy and Mr. Watson from Belize to the celebrated ruins of Palatay, in the province of Yucatan, in Guatemala. Notwithstanding their grandeur and immense extent, they were not known to travellers until the latter part of the last century, when it required the aid of 100 Indians to cut down the trees by which they were surrounded, so profuse was the vegetation. The remains are evidently of Egypto-Indian architecture, and in them was seen the true Saracenic arch, which has not hitherto been met with out of the country of the Saracens. The travellers were 48 days in the ruins, making sketches, and returned to Belize through a country rich in every variety of natural produce, and with which an extensive and advantageous commerce with this country might be carried on.

Compensation of Magnetic Attraction on Iron Ships.—As the steam-ship Wilberforce for the Niger expedition is built of iron, it is necessary to correct the attractions on the magnetic needle caused by the vicinity of such a large mass of

iron, otherwise the compass would be of little avail. The following is the plan adopted. The iron boat, of which the compass error is to be corrected, is placed in a dock basin, for instance, and her head placed due north by a compass on shore, the binnacle needle is then observed, and by means of a powerful bar magnet drawn from its deviation to the north, the bar magnet being then and there fixed. The vessel is then turned east, so that her direction be cast and west, and by a similar bar magnet, placed perhaps at right angles to the former one, the error of this direction is corrected. These two bar magnets are sufficient to counteract the effects of the permanent and induced magnetism of the vessel. The only other source of error is any isolated mass of soft iron in the neighbourhood of the binnacle, and this is removed by a small box of soft iron fixed over the compass.

Experiments on Marine Propellers.—Among the mechanical models now exhibiting at the Polytechnic Institution is one of the *Archimedes* steamer, with the screw of Mr. Smith in its most improved form; another of a boat with Mr. Stephen's paddle-wheel; and a third of a man of war with Capt. Carpenter's new quarter propellers—so called from their being placed under the hind quarters of the vessel. The following comparative experiments with these models were made last week. First, the vessels of Mr. Stephens and Capt. Carpenter were lashed stern to stern, and started together at the same instant. The paddle-wheel propelled vessel soon yielded to the superior power of the new propeller, and was dragged up to the other end of the sheet of water. Second, a trial of speed then followed; the result of which was that Capt. Carpenter's model went along nearly twice as fast as Mr. Stephen's with the paddle-wheel. The two vessels, it is proper to state, were well matched in size and in other respects. Third, the *Archimedes* then challenged Capt. Carpenter. The two vessels were placed abreast of each other, and at a given signal they started together. The result of the experiment was that Capt. Carpenter's model beat the *Archimedes* in speed, and with a very inferior motive power.—*Correspondent of Mechanics' Magazine.*

Bread submitted to the Action of the Hydraulic Press.—M. Laignel recently stated at the Academy of Sciences, Paris, that immediately after bread has been thus treated, it becomes extremely hard and dry, and after eight months it lost still more water, and became as hard as stone. In this state it appears likely to be able to be preserved for a long period of time, as it is with difficulty softened by water. In order to use it it is requisite to grind it previously, so as to reduce it to a kind of flour. M. Laignel is also of opinion, that other alimentary substances might be equally well preserved, after being dried by the hydraulic press.—*Comptes Rendus.*

Electrotype Seals.—Among other uses to which the art of electrotyping has been applied, is that of making desk seals from impressions of other seals in wax. This seems to render further precaution against forgery and fraud necessary; as it is now easy to obtain the facsimile of a seal to be used for fraudulent purposes.

New Application of Zinc.—The implements called "galleys," on which printers place the type in the first instance for pulling proofs, have been lately made of zinc instead of brass. It is said that they answer equally well with those of brass, and cost not more than one third of the price.

M. Raifé recently submitted to the notice of the Academy of Sciences, Paris, a photographic image on the prepared silver paper, which approached the nearest to those previously presented, and obtained by the ordinary process on the silver plate.

Testing the Dead.—The *Prussian State Gazette* mentions that Professor Nasse, of Berlin, has invented an instrument, which he calls a Thanatometer, by means of which it can be ascertained whether persons apparently dead are actually so or not. The invention has been referred to the Medical Board of one of the hospitals to make a report upon its efficacy.

The Perpetual Rose.—A Parisian florist has succeeded in producing a new hybrid rose from the Bourbon rose and Gloric de Rosomene, the flowers of which he had fertilised with the pollen of some damask and hybrid China roses. The plant is extremely beautiful, the color bright crimson shaded with Maroon purple, and is further enriched with a powerful fragrance.

Antique Curiosity.—A few days ago some workmen employed in cutting a drain through the estate of Messrs. Kilvington and Vicerman, on the Kirkstall-road, Leeds, found a fine and beautiful horn of the elk kind 6½ feet below the surface of the ground. To all appearances the ground had not been disturbed for many centuries past, and the horn was laid upon the gravel bed covered by a bed of solid clay 4½ feet deep, and a surface of earth of two feet deep. The horn is in a state of fine preservation, and although it is evident that a considerable part of the root end of it is wanting, it still measures about three feet in length, and contains eight stems or branches.—*Leeds Intelligencer.*

Coal-Tar and Lime as Manure.—Mr. Webster of Ipswich recommends the employment of coal-tar and slacked lime as manure. The following are the proportions: take one gallon of coal-tar, and mix it up well, and completely, with one bushel of slacked lime; this mixture produces a material of warmth and value as a manure, rich and stimulating, and tending very much to keep away flies, when sprinkled freely in among young turnips. He also recommends the use of animal tar, or dippel oil, procured from the distillation of bones, which when mixed with slacked lime, as above, forms a much richer and more serviceable manure than that of the coal-tar.—*Trans. Soc. Arts.* 1841.

Meteoric Paper.—The microscope has been ably employed by Ehrenberg to determine the composition of the Meteoric Paper of 1686, and which he states is a product of *Confervæ* and *Infusoria*, now existing on our globe. According to this author the substance known by the name of Meteoric Paper, and which fell near Rauden, in Curland, in 1686, is formed of filaments of *Conferva crispata*, thickly matted together, with remains of a Nostoc, twenty-nine well preserved species of Infusoria, and the cases of *Daphina putex.* Of the twenty-nine Infusoria eight only have silicious *Loricæ;* the rest have soft coverings. In the Meteoric Paper of Schwazenberg, Ehrenberg found *Conferva capitlaris, C. punctatis*, and *Oscillatoria timosa*, along with twenty distinct species of Infusoria, &c. In a mass found in Sweden, *Œdogonium vesicatum* (Liuk) Infusoria, and the *potlen* of some Coniferæ were discovered.—*Microscopic Journal.*

Infusorial Animalcules in Red Snow.—Mr. Shuttleworth relates, that being occupied in the examination of some red snow that fell at the Grimsel, and expecting to see only inanimate globules of *Protococcus nivatis*, he was astonished to find, that it was composed of organised bodies distinct in nature and form, partly vegetable, but the greater number endowed with the liveliest powers of motion, and belonging to the animal kingdom. Among these he named one species, *Astasia* (Ehrenb.) *nivalis*, and another *Gyges sanguineus.*—*Bibl. Univ.* (*Ann. Nat. Hist. Vol. V.*)

On Animalcules contained in Chara.—Thuret has observed in the interior of the anthers (globules) of *Chara vulgaris* and *C. Hispida*, flexuose, transparent, chambered filaments of unequal length, in which are contained animalcules at first motionless, but after a time they move and struggle to release themselves from their prison. In this they do not always succeed, although their twisted position attests the efforts made for disengagement. They appeared like a spirally-rolled thread of three to five curves, with two appendages, bristles, or tentacula of excessive tenuity, which the animalcule incessantly agitates with great rapidity.—*Microscopic Journal.*

VARIETIES.

Exportation of Machinery.—The Committee of the House of Commons appointed to inquire into the nature of the practices connected with the exportation of machinery, are continuing the examination of witnesses. Mr. Marshall, the owner of the large flax spinning mill at Leeds, has been examined at great length. It appears that the value of each spindle used in his manufactory is about £4, which, according to the number in use, were of the value of £100,000; the value of their produce annually being £200,000, and deducting £100,000 for the price of the raw material, the remaining £100,000 was for wages, capital, and profit. It is not perhaps generally known that there are ingenious men in the county of Lancaster employed exclusively by foreigners to take models of all new machines used for their manufactures. The modellers are connected with the operatives, and the model of every piece of a new machine is taken before the machine itself is constructed. These are transmitted abroad without delay, and the foreigner has a similar machine constructed almost as rapidly as the English inventor or patentee.

Copyright in Designs.—Mr. E. Tennent has postponed the Copyright in Designs Bill until after Easter, owing to the pressure of business on the night for which it was originally fixed.

Steam Competition on the River.—There will be a large increase in the number of steam vessels on the Thames, both above and below bridge, during the ensuing season, and the steam-boat architects, engineers, boiler-makers, painters, and decorators are busily employed on the banks of the river. The watermen have now indeed bidden farewell to their "trim-built wherry," and have established a company called the Watermen's Steam Packet Company, which has already laid down eight steamers.

Mails in Ireland.—The following are the rates of travelling per hour of certain mail coaches in Ireland, as shown by Parliamentary return. Dublin and Belfast mail, 8¾ British miles per hour; Dublin and Waterford, 8½ miles; Dublin and Limerick, 9½ miles; Dublin and Londonderry, 8½ miles; Dublin and Cork, *viâ* Clonmel, 7⅞ miles in winter, and 8⅝ miles in summer.

Reduction of Postage to Hamburgh, Cuxhaven, and Lubec.—It has been determined, that on and after the 6th of April next the postage of all letters posted in the United Kingdom for either of the above places be reduced from 1s. 8d. and 1s. 10d., to a uniform rate of 6d. the half ounce, and 1s. the ounce, and so on. This reduction does not apply to letters for the above places when sent *viâ* France, which will only be done in cases where specially direct ed.

Aurora Borealis.—This interesting phenomenon was distinctly observed at Sheffield, Scarborough, and other places in the north, on Monday night.

On Saturday morning se'nnight, about half past 8 o'clock, a very beautiful halo appeared, surrounding the sun; and at each extremity of the circle, to the right and left, appeared a mock sun. That on the western side of the halo appeared brilliant, and the sun's image distinct and well-defined; but the other, on the eastern side, though equally brilliant at the centre, was rather defective in the general contour. This rare phenomenon continued its exhibition for the greatest part of an hour; the air was cool, and the sky rather obscured, with a little haze, and light fleecy clouds.—*Halifax Paper.*

Longevity in Italy.—In opposition to the opinion generally entertained that the duration of human life is greater in northern counties than in the south, centenarians are by no means uncommon in the kingdom of Naples. The *Journal des Deux Siciles* of the 4th of March announces the death of a man and woman, in Calabria, one at the age of 106, and the other at the age of 105. The latter had twenty-four children.

Earthquake at Reggio.—Letters from Naples bring intelligence of the destruction, by an earthquake at Reggio, of the cathedral, four churches, three chapels, the palace of the provincial government, the police office, and a great number of houses; ten or eleven persons were killed and three hundred injured. The same shock was felt at Messina.

Earthquake at Ammerapoora.—This city is said to have been almost entirely destroyed by an earthquake, which happened on the night of the 23d of March, 1840; 300 persons were killed. The shock lasted two or three minutes, and extended from north to south. The cities of Ava and Tragain are also said to have been destroyed, with many neighbouring villages.

Volcano in Batavia.—It is stated in letters from Batavia of the 25th of last November, that the volcano Gedé had been very active. Although few flames had appeared, the volumes of smoke issuing from the crater were very dense; and a slight fall of cinders had been experienced. The phenomena were most perceptible at Patjet, ten miles from Tanjor, from which place it is said flames were observed. The most remarkable of these volcanic phenomena occurred on the 12th of November.

Diamond Mines and Gold Mines in Sumatra.—It is stated in letters from Amsterdam that a diamond mine has been discovered in the district of Doladulo, in the southern part of Sumatra, which, according to all appearances, is as rich as the most abundant of those of Borneo. The mine is to be worked by the government. The gold mines of Boujol, and of Kampong Kardi, in the same island, which have only been worked since 1837, become more and more productive the deeper they are sunk. From these mines, where formerly the gold was found only in the form of powder, masses of gold are now obtained, weighing from two to three and even as much as four pounds.

Iron in North America.—We learn that a considerable change in our extensive dealings with the United States in the article of iron is likely to take place, and the enormous exports of pig iron to that continent will be greatly diminished, in consequence of late discoveries of immense quantities of iron of a very superior quality in Maryland. What renders this discovery of so great value is, that both water and railway carriage are at hand, and an inexhaustible supply of coal and wood. Mr. J. E. Puddie, the agent for the estates, has despatched an experienced mining engineer and a surveyor to report on this property, which will, it is said, be worked on a large scale by English capital.

Voracity of a Boa Constrictor.—A singular instance of the voracity and power of appetite of this reptile occurred a few days since at the Zoological-gardens in the Regent's-park. Two fine tiger boa constrictors were brought over by Captain Redman from Calcutta, and presented by him to the managerie on 4th September last. They were respectively 11 feet and 9 feet in length, and had lived in harmony together in their cage until last week, when the smaller one, being sickly, would not eat at the usual time of feeding. The larger one had just eaten a rabbit and three guinea pigs, when it appears he made a gorge of his more weakly companion, which was proved by the sudden disappearance of the latter, and the more bulky size of the former, which exceeded three feet in diameter in the greatest proportion of his body. So singular a case of the carnivorous power and propensity of this reptile is not on record.—*Morning Chronicle.*

Falling of a Floor-cloth Manufactory.—On Wednesday afternoon, the floor-cloth manufactory belonging to Messrs. Wringdon and Kendall, erecting in Page's-walk, Grange-road, Bermondsey, fell down. It appears that the workmen, to the number of fifty, were employed in erecting the framework of a building of very large dimensions, and had raised several massive pieces of timber upwards of forty feet in height, which were bolted to the joists intended to support the flooring; these had been also secured by braces at the top to keep them in their upright position. The wind had been blowing very hard all the morning, and Mr. Deane, the builder, had taken the precaution to place additional braces for further security, but a violent gust of wind snapped the braces and in an instant levelled the whole fabric with the ground. Seven men were crushed by the falling mass, five of whom were seriously injured.

Rapid Vegetation.—A few days ago the shoot of a common briar, or bramble, was cut on Thistle Hill, Knaresborough (near the place where Eugene Aram was hung in chains), which, when measured, was found to have attained th astonishing growth of thirty feet and upwards since last March.—*Halifax Paper.*

The Marquis of Normanby has appointed Major James Glencairn Burns, the youngest son of Burns the poet, to be a Sub-Inspector of Factories.

Operation for Squinting.—This new surgical operation has been recently tried scientifically in three cases at Inverness.

Periodical Survey of Vessels.—We hear that the committee for managing the affairs at Lloyd's have adopted a resolution to the effect, that all vessels in future shall be surveyed periodically, as by the regulations, in order to be retained in the register book in any manner.

Rewards to Inventors.—A daughter of the late Samuel Crompton, sole inventor of the "mule," is compelled to apply for parochial relief; while the family of Arkwright ranks among the wealthiest in the kingdom.

LAW OF PATENTS.

ALL WORKS PUBLISHED on the PATENT LAWS of Great Britain and Foreign Countries, and all the PERIODICALS relating to INVENTIONS, MANUFACTURES, RAILWAYS, STEAM NAVIGATION, SCIENCE, and the ARTS, are to be had at

THE PATENT OFFICE, 198, STRAND.

AMONG OTHERS, THE FOLLOWING WILL BE FOUND OF PERMANENT INTEREST:—

WORKS ON THE PATENT LAWS.

CARPMAEL (W.), on the Law of Patents for Inventions, familiarly explained for the use of Inventors and Patentees, 5s.

COLLIER'S (John Dyer) Essay on the Law of Patents for New Inventions; to which are prefixed two Chapters,—on the General History of Monopolies, and on their Introduction and Progress in England to the time of the Inter-regnum; with an Appendix, containing copies of the Caveat, Petition, Oath, and other Formulæ, with an arranged Catalogue of all the Patents, granted from Jan. 1, 1800, to the year 1803, 15s.

DAVIES' (John) Collection of the most important Cases respecting Patents of Invention, and the Rights of Patentees, which have been determined in the Courts of Law since the Statute for Restraining Monopolies; to which are added some Practical Observations resulting from the decision on the several cases, 16s.

DREWRY'S (Charles Stewart) Patent Law Amendment Act; with Notes and Cases, and an Appendix of Rules and Forms, 5s.

GODSON'S (Richard) Practical Treatise on the Law of Patents for Inventions, and of Copyright: Illustrated by Notes of the Principal Cases, with an Abstract of the Laws in Force in Foreign Countries, 16s.

HANDS' (William) Law and Practice of Patents for Inventions, 5s.

HOLROYD'S (Edward) Practical Treatise on the Law of Patents for Inventions, 10s. 6d.

LETTERS and SUGGESTIONS upon the Amendment of the Laws relative to Patents for Inventions; together with Papers and Documents connected with the Reform of the Patent Laws. Also, Lord Brougham's New Act on the Patent Law, as printed by authority of Parliament, 3s.

PERPIGNA'S (Antoine) Manuel des Inventions et des Brevetés,—French Edition, on the Law of Patents in France, 5s.

Ditto, ditto, Translated into English, 3s. 6d.

PRITCHARD'S (Andrew) List of all the Patents for Inventions in the Arts, Manufactures, &c. &c., granted in England during the Present Century, including those now in force. 7s. 6d.

RANKIN'S Analysis of the Law of Patents, 3s. 6d.

SMITH'S (John William) Epitome of the Law relating to Patents for Inventions, as altered by Statute, 5 and 6 W. IV., c. 88; with an Appendix of Statutes and Forms, 5s.

VARLET'S (M.) Recueil des Lois et Réglements, en vigeur en Belgique, sur les Brevets d'Invention—French Edition on the Law of Patents in Belgium and other States, 5s.

WEBSTER'S (Thomas) Law and Practice of Letters Patent, for Inventions, Statutes, Practical Forms, and Digest of Reported Cases, 9s.

SCIENTIFIC PERIODICALS.

Art-Union.	London Journal of Arts.
Athenæum.	Magazine of Science.
Chemist.	Mechanics' Magazine.
Chambers' Information for the People.	Mirror.
Civil Engineer and Architect's Journal.	Mining Journal.
Gardeners' Gazette.	People's Magazine.
Glenny's Gardeners' Gazette.	Philosophical Magazine.
Gardeners' Chronicle.	Polytechnic Journal.
Gentleman's Magazine.	Provincial Medical and Surgical Journal.
Lancet.	Railway Magazine.
Law Magazine (Monthly).	Railway Times.
Legal Observer.	Railroad Quarterly Journal.
Literary Gazette.	Repertory of Arts.
	Spectator.

ACTS OF PARLIAMENT.

PATTERNS,—

27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17. (The last relates to patterns and *models.*)

PATENTS FOR INVENTIONS,—

2 and 3 Victoria, c. 67.

SCULPTURES,—

38 Geo. III., c. 71.

ENGRAVINGS,—

7 Geo. III., c., 88; 17 Geo. III., c. 57.

COPYRIGHT,—

8 Anne, c. 19; 12 Geo. II., (Booksellers' Act), c. 36; 15 Geo. III. (Universities' Act), c. 53; 54 Geo. III. (General Copyright), c. 156.

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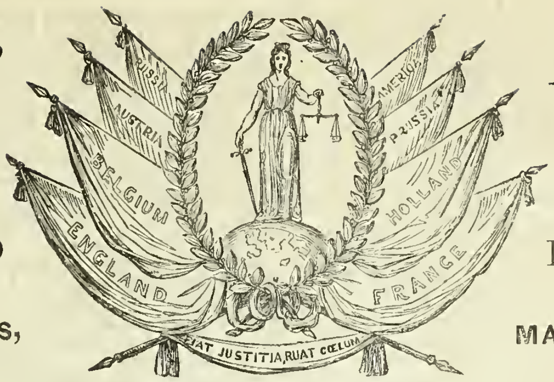
THE

INVENTORS' ADVOCATE,



AND JOURNAL OF INDUSTRY;

A WEEKLY BRITISH AND FOREIGN MISCELLANY OF

SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

No. 89.] SATURDAY, APRIL 10, 1841. [PRICE FIVEPENCE STAMPED. CIRCULATING FREE BY POST.

LOSS OF MOTION BY THE CRANK.

The loss of power in transmitting motion by the crank has been already noticed generally in our consideration of reciprocating steam-engines; we now propose to examine the question more narrowly, and to endeavour to estimate the quantity of power thus lost. This becomes the more necessary, as some writers have lately asserted that the communication of motion by the crank is not attended with loss, and that when used in connection with a fly-wheel, beam steam-engines are made to impart the whole of their power effectively in a circular direction.

The crank may be employed either in converting a rotary motion into an alternating one, or, as is more frequently the case, in transmitting the action of a reciprocating beam or a piston-rod to a revolving wheel. We shall direct our remarks more particularly to the latter mode of employing the crank, the motion being communicated by a connecting rod attached to the beam. In such a disposition of the machinery it is evident that the power is exerted at the circumference of the circle described by the crank. Now all power so employed, even when directed most advantageously, must act at a tangent to the circle; for the tendency of motion is in straight lines, nor can it be made to bend without the exertion of other counteracting forces. The counteracting force, when rotary motion is communicated to a wheel or crank, is the cohesive resistance of the particles of iron. As the wheel moves on its axis more readily than the iron can be torn asunder, a circular motion is the result; but this resulting motion is composed of two forces—that of the moving, and that of the restraining power. It must be evident that in this, as in all other compositions of motion, there must be a loss of power; and the amount of power thus lost will depend upon the variation between the direction of the moving power, and of the motion actually communicated. During the revolution of the crank, the moving power and the motion imparted can only correspond when the crank and the connecting rod are at right angles; and this they can only be at two points of the circle. During the rest of the revolution, therefore, the power and the motion are at variance, and in proportion as this variance is greater or less, we contend power must be lost.

We might form a tolerably accurate estimate of the amount of power thus wasted in communicating rotary motion by the crank, by a series of measurements on one of the quadrants described by the crank. If the lower quadrant of the circle, for instance, were divided into degrees, and the angle formed by the connecting rod and the crank at each degree were marked, and compared with the angle formed by the connecting rod and the tangent to the circle at that point, the amount of power lost at each division of the circle might be ascertained. For instance; the crank will represent a radius from the centre of the circle to the circumference, and a line drawn perpendicular to, and at the termination of, the radius will be a tangent to the circle at that point, and will represent the direction in which motion must be there imparted to produce rotation in the crank. The position of the connecting rod will indicate the immediate direction of the force, and the tangent the direction in which it really acts. Now the rule for ascertaining the portion of a force which acts in a direction different from the immediate direction of the force itself, is, to draw a perpendicular from the line in which the body moves to the line of direction in which the force is exerted, and the proportionate lengths of the two lines show the amount of force actually exerted in either direction. As the motion is however given in only one direction, the quantity indicated by the other line is so much power lost. By proceeding in this manner in each degree in the quadrant, according to the plan commonly pursued in estimating the amount of force resulting from the composition of two different motions, the proportion of the power effectually exerted in communicating rotary motion to the crank, and the quantity lost by pulling against the axis of the crank-shaft, may be ascertained, and the sum of all may be considered to represent the quantity of power absolutely lost and the quantity effectually exerted during one quadrant of the circle. It will be found that near the dead points almost all the power is lost, that the loss diminishes gradually as the angle of the crank and connecting-rod enlarges, until they form a right angle; at which point the line of motion and the direction of the moving power are the same, and then all the force is profitably exerted.

By the foregoing method of estimating the loss of power by crank action, it will be found that when the crank has been lifted, vertically, through one-eighth part the diameter of its circle of revolution, the proportion which the power lost bears to that efficiently employed is about two to one; and that the crank must be raised vertically to one-fourth part its diameter, and describe nearly two-thirds of the quadrant, before the power effectually employed equals the power exerted prejudicially against the axis of the crank-shaft—not only useless in communicating motion, but directly resisting it by increasing the friction of the crank.

There is another disadvantage attending the crank, arising from the irregularity of its action. Independently of the disproportion which its rotary motion bears at different parts of its revolution to the motion of the impelling alternating beam, which renders the regulating power of a fly-wheel an almost necessary adjunct to the crank, there is a further irregularity, arising from the oscillating motion of the connecting rod. In consequence of this motion the beam has to descend, vertically through a greater space to enable the crank to complete the upper quadrant of its circle than during the completion of the lower quadrant. This irregularity diminishes in proportion to the length of the connecting rod, and the consequent decrease of its deviation from the perpendicular in carrying the crank round its circle. To whatever extent this irregularity of action exists, it must tend to throw a greater proportion of power into the action of the upper semi-circular path of the crank than into the lower one; because the power of the reciprocating beam bears on it through a larger space.

The varying relative velocities between the crank and the piston-rod which impels it, becomes, in some instances, peculiarly advantageous. This is particularly the case when the crank is used to work the pistons of force pumps for compressing gases, rotary motion being in that case converted into reciprocating. When the crank is thus used it acts as an adjusting lever, the mechanical advantages of which increase as the resisting force against which it acts increases. For example, in compressing gases it is well known that the resistance increases as the piston descends, till the gas becomes sufficiently compressed to force open the valve connected with the vessel into which it is forced. It is at that part where the resistance becomes the greatest that the motion of the crank in its revolution is so much greater than the vertical

motion of the piston: and the power consequently acts (independently of the loss of motion from its indirect application) with the greatest effect.

In no mode of employing the crank, however, can the mechanical disadvantages we have pointed out be obviated. The loss of power must of necessity be very great, for it is exerted, as we have shown, during a great part of the circle moved through directly against the axis, and on only two points in the direction of the motion actually given.

PROCESS FOR EXTRACTING THE ORE IN LEAD MINES CONTAINING GOLD AND SILVER.

The beautiful experiments of M. Becquerel on the adaptation of electro-chemical action to effect the separation of lead and silver in the galena containing gold and silver, have demonstrated the possibility of applying electricity in the management of these mines. This valuable discovery has indeed been already adopted on a large scale by M. Becquerel, in the experimental manufactory that he has established at Paris; but, as is often the case in inventions of great importance, many years will probably elapse before his system is universally adopted in the working of lead mines containing silver. M. Becquerel observes, in reference to the method of extracting the metal at present pursued: As a proprietor of the auriferous and silver lead mines in the Duchy of Baden, I have carefully attended to the various processes that are generally adopted, and I am convinced of the possibility of obtaining a much greater produce from the mines by improving this process.

The observations that I have made, may be of some use to the lessees or proprietors of lead mines coutaining silver or gold. I will mention them in succession, pursuing in detail the method of working in the mines that I have superintended for ten years. Many of these mines are very rich in silver and gold.

First, as to the manner of washing the ore. By the manner in which the process is now executed, it is evident that a considerable quantity of the ore is lost, and the portion lost is that which is of the greatest value, the sulphuret of silver.

The gold and silver galenas have in general for their matrix a very hard quartz in which are irregularly embedded sulphurets of silver, lead, iron, sulphate of barytes, or carbonate of iron, and also fluor spar. The variety of sulphurets that I have just enumerated contain gold, but in such a state of tenuity, that it is invisible in a microscope, aud eludes every attempt to analyse it; yet gold does exist, since it is found in considerable quantity in assaying the silver. The ore broken into pieces of from two to five centimetres, falls by degrees into the trough in which the stampers work. A current of water passes through this trough, which is closed in front by a very close iron grating. The percussion of the stampers must be continued for a long time to reduce the ore sufficiently small to admit of its passing through the grating, and being carried into long canals called labyrinths, where it is deposited at a distance further or nearer in proportion to its size.

In attentively examining what takes place during the process of washing, it is remarked, that the fragments of ore, owing to the great hardness of the matrix resist the percussion of the stampers for a considerable length of time, and that they only very gradually diminish in size till they are completely broken. The ore thus successively reduced into minute pieces, is gradually carried away by the current of water beyond the labyrinth, where it ought to be deposited; and the loss of this part of the ore is more to be regretted, as the sulphuret of silver being very friable, it is the sulphuret that is first carried away; none remains but what is contained in those pieces of the ore, which from their size and weight have had power to resist the influence of the current.

I am well assured that the loss which I have just stated, is but too certain, as at the extremity of a labyrinth which reached for 200 metres, I took up water that was impregnated with the deposits of ore. This sediment, on being put to the test, yielded in the same weights a proportion of silver equal to that of the sediment in the water at the entrance of the labyrinth. The particles of gold disseminated in the sulphurets of lead, iron, and silver, not in a state of combination, but only united mechanically, escape in the same way.

Many ingenious men have in their writings indicated as a method of collecting the gold contained in minerals and in auriferous sands, the levigation of these very finely comminuted substances; but I cannot suppose that in this manner they imagine it possible to obtain the whole of the gold; this could only be done by means of chemical analysis. A very simple experiment will suffice to prove how very inefficient the levigation is for this purpose.

Take two discs formed of an alloy composed of lead, silver, and gold, and give them a circular motion against the surfaces of each other, by keeping them immersed in a vessel full of water. The water will very soon be rendered turbid and cloudy. If in the same water two discs of the mineral in which the ores are imbedded (quartz for instance) are afterwards rubbed against each other, long enough to add new particles to those already contained in the fluid, all the metallic and earthy particles will not be settled till after eight days, and no trace will be perceived on the outer surface of the glass vase that the particles have been deposited according to their specific gravities. They will appear all mingled. Hence it may be concluded that when metals, ores, minerals, and sands in a state of extreme division are mixed, levigation is an ineffectual means of producing their complete separation.

The next operation to be considered is that of smelting the ores. The products of the mines are also greatly diminished at present by the loss of lead, silver, and gold, in the operation of smelting, in either reverberating or other furnaces generally used.

In the former case the roasting of the slag is a long and difficult operation, and with many ores almost impossible; those of Baden for instance, of which the matrix composed of quartz, of sulphate of barytes, and of fluor spar, is fusible to such a degree, that in making use of the reverberating furnace it would be necessary to smelt without previously roasting, and to let the first melting run out, which it would be necessary afterwards to calcine before resmelting in another furnace, which must also be resorted to, to extract part of the refractory scoriæ. Tho losses in smelting are occasioned—

1st, By the volatilisation of a great quantity of sulphuret of lead and sulphuret of silver, before their reduction.

2d, By the action of the fluxes, and particularly by the silex on the lead at its different degrees of oxydation, from whence is produced the siliciurets of lead which unite with the scoriæ.

3d, By the alkaline sulphurets aud persulphurets, which in a great degree absorb the gold contained in the ore to be smelted.

4th, By the great quantity of fuel necessary to be used to retain in a state of constant fluidity the enormous proportion of the scoriæ of forges and furnaces obliged to be added to the melted ore, in order to secure the metal from being reduced by oxydation and volatilisation during the time it is passing into and remaining in the furnace, where I believe the temperature is raised to a much higher degree than is necessary.

5th, Finally, because, instead of obtaining by one smelting in which there is so great a consumption of combustible, the whole of tho lead contained in the ore, only half of it is at first extracted, and the other half must be afterwards calcined, which is only an impure metal or sulphuret, in order to be smelted again.

I make no observation on the mauner in which the operation of cupelling it is done at Badeu, because I believe it is impossible to be managed better.

The consequence of the inconveniences that I have enumerated is, that though the produce arising from the gold and silver lead mines is quite equal to what might be expected in their present condition, it is yet capable of being considerably increased by improving the method of washing and smelting. I am in possession of the certain method of effecting this, which I shall allude to in another paper.—*Moniteur Industriel.*

ON THE REFINING OF SULPHUR FROM EARTHY MIXTURES.

When sulphur is found in combination with earthy matter, its purification generally consists of two distillations; the first roughly performed on the spot where it is obtained, with the object of rendering the cost of carriage less expensive; the second is made with more care, near the spot where it is brought to market. At Solfatara the first distillation is executed in a furnace, or gallery, in which are arranged ten or twelve earthen pots, about twenty inches apart, in two ranges—each of these pots containing about thirty pints. When filled with ore, broken to the size of road metal, the top is luted down, but there is a tube connected with an opening in one of the shoulders of the jar, about two inches in diameter and fourteen inches long, which communicates with a second jar, pierced with a hole at the bottom, from which the sulphur flows into a tub of water, and is then condensed—it is sublimed in the first jar and cooled down in the second. At Marseilles there is a large establishment for the refining of sulphur, conducted by M. Michel, who invented the apparatus; it consists of a cast-iron retort, and a vast chamber, which serves as a conductor. The retort, containing about 1,500 or 1,600 lbs. of material, is heated by a furnace, which, however, has no communication with the chamber or the retort; an iron door in front serves to clear and recharge the retort, the beak of which conducts the fumes of the sulphur to the large chamber, where they are condensed and collected either in a liquid state or as the flowers of sulphur; the temperature of the condenser alone effecting the condition in which it is obtained. Much care is necessary to be observed in this process, as the admixture of a very small portion of air with the fumes in the chamber gives rise to explosions, which are sometimes dangerous, for it often happens that the temperature of the chamber is carried to the height of 150 deg. (sufficiently high to inflame the sulphur); sulphuric acid is then rapidly formed, and in this process much heat is given out, and an explosion always follows. By valves placed at proper places this may be avoided, and the chamber should be freed of its oxygen by burning sulphur or charcoal in it before commencing to operate. Of late years the method which has been adopted, termed "decantation," has greatly removed the difficulty of the process, as explosions are now seldom known to occur. This arrangement consists in placing a large vessel, filled with crude sulphur above the retort of distillation, and allowing the heat of the chimney to act upon it; a tube is made to wind round this vessel, furnished with valves, to permit the melted sulphur to flow through it and communicate with the bottom of the retort containing the sulphur to be distilled; this disposition has the advantage of maintaining a more uniform temperature, and rendering the operation more rapid. By the ordinary method the loss amounted to about 18 or 20 per cent., but by M. Michel's modification the loss is reduced to 11 or 12 per cent. Notwithstanding these precautions, the fumes of sulphuric acid which escape when opening the chamber to extract the sulphur or clear it out, frequently destroys all vegetation in the neighbourhood; it is, therefore, important to construct them so that the sulphur can be withdrawn without entering the chamber. Eight or nine charges are usually evaporated before running off the sulphur. It is of great importance to have thermometers inserted in the chamber, at such places as they can be observed,

as we have seen that, if the sulphur is above the temperature of 110 deg., and suddenly cooled, it loses its citron color, and is not so valuable in the market, although equally pure.—*Mining Journal.*

INEXPLICABLE PHENOMENA OF UNANNEALED GLASS.

(*From the Liverpool Mercury.*)

We have long been accustomed to regard the phenomena which precede and attend the fracture of unannealed glass, as some of the most remarkable and inexplicable of all the manifold secrets of nature. Many other phenomena, although curious, might have been predicated after mature reflection, as they are in strict accordance with the known laws of nature; but we think we may confidently assert, that no man, how skilled soever he might be in chemistry or any other department of natural philosophy, could have predicted the effect produced upon unannealed glass by the most apparently insignificant and inadequate cause. If any philosopher or chemist, for instance, had been asked what would be the consequence of dropping a few grains of light sand into a goblet of glass not properly annealed, he would never have guessed that the effect would be to shiver the tumbler into atoms. As it is possible that some of our readers may not understand what is precisely meant by unannealed glass, it may be proper here briefly to explain the term :—

When glass, from the melting-pot, is fashioned into tumblers, bottles, &c., it is gradually cooled by being removed successively from a higher to a lower temperature, which process is termed annealing. When this gradual process is neglected, the most extraordinary results are found to take place. What are called Prince Rupert's drops are an excellent and familiar illustration of the anomalous phenomena under consideration. They are formed simply by dropping a little melted glass into cold water, when it suddenly collapses into a small pear-shaped drop, with a slender thread-like tail or extremity. If the thick end of the drop be held in the hand, and the small end be broken off, the whole of the glass will fly into shivers, imparting to the hand a smart shock, similar to that from an electrical jar. What is equally singular is, that if Rupert's drops, instead of being broken in the manner described, be thrown down forcibly upon flags, they will recoil by their elasticity, but they will not be broken, how violently soever they be brought into contact with the flags.

We have now to notice another of the numerous phenomena exhibited by unannealed glass, which is not so generally known as that of the Rupert's drop, but which is equally inexplicable. It was communicated to us several months ago, by the correspondent whose note we here subjoin, with a few comments appended to it:—

"SIR,—Allow me, then, to detail a curious accident which happened under my own hands, with a glass tube, and which has occurred to several others, to whom I have mentioned it. Some short time ago I procured a glass tube for the purpose of constructing a barometer. After cleaning it well with an *iron wire*, tipped with wash leather, I placed it upon a table, and was astonished to find, in a quarter of an hour, the tube broken into several pieces. On mentioning it to a friend he immediately pronounced it to be caused by the wire, as he had had a similar accident. Not being satisfied that it could be produced by the wire, I placed another tube with a bit of wire in it, and was surprised to find, that, in a short time, the tube broke into several pieces. I cannot account for the phenomena, neither is the fact noticed in any scientific treatises with which I am acquainted. Barometer makers seem to be aware of it, and never use wire in cleaning their tubes.

The phenomenon, which is the subject of our correspondent's letter, is familiar to the barometer makers, who, in cleaning out the interior of the tubes, take especial care that the iron wire employed for the purpose shall not touch the glass, as the contact of the two substances is almost uniformly followed by a fracture of the glass, not immediately, but after a short interval. This is one of the most extraordinary circumstances of the phenomenon; as it is difficult, if not impossible, to form any rational explanation of the secret mysterious operation which must be going on in the tube, between the moment of contact with the wire and the subsequent fracture. If, as there is reason to conclude, the momentary contact of the wire with the glass produce the fracture, why does i not instantly take place? There appears to be an effect, without an adequate or intelligible cause. It seems that this kind of phenomenon is not altogether confined to glass, but occasionally occurs in cast metal, probably from its sudden cooling, or from not having been properly annealed. However that may be, it is a fact that the metal of which the mirrors of reflecting telescopes are constructed, is very apt to fly to pieces by the slightest scratch, just like the barometer tubes in consequence of their coming in contact with the iron rod used to clean out the inside.

In conclusion, we may observe, that the phenomenon of the barometer tubes, noticed by our correspondent, is to be ascribed, no doubt, to their imperfect annealing, and that the remedy for the defect would be that pointed out by Mr. Pellatt, of London, at a late scientific meeting, from the report of which we transcribe the following passage :—

"Mr. Pellatt recommended boiling as a safe and good mode of annealing all kinds of glass. In the ordinary method of annealing, thick and thin ware is often subjected to the same process, and remains in the leer for the same period; this would account for the superior duration of the thin tubes. He attributed the fracture of the tubes to the tension of the exterior coating and the vibration caused by the process of cleaning; this effect was so well known that an old tube could scarcely be sold, as it generally broke in cleaning."

ON THE POWER OF FLUIDS IN MOTION.

In Silliman's American Journal for January last appears the following abstract of a paper read at the American Philosophical Society, "On a new Principle in regard to the Power of Fluids in Motion to produce Rupture of the Vessels which contain them, and on the Distinction between Accumulative and Instantaneous Pressures; by Charles Bonnycastle, Professor of Mathematics in the University of Virginia."

Mr. Bonnycastle's investigation was suggested by a paper read by Dr. Hare, and printed in the Transactions of the Society, entitled "On the Collapse of a Reservoir, whilst apparently subject within to great Pressure from a Head of Water." Dr. Hare pointed out the circumstances attendant upon this curious occurrence, and showed how the vessel might have been momentarily relieved from the pressure of the water within, so as to make that of the surrounding air efficient in producing the collapse. The principal object of Mr. Bonnycastle's paper is to investigate the precise nature and degree of the forces brought into action in this and similar cases.

The results at which Mr. Bonnycastle arrived are stated by him as follow :

1. It is convenient to distinguish between accumulative and instantaneous loads, or between those which are gradually increased until the deflection due to the ultimate load is obtained, and those which commence in full efficacy from the initial position of the support.

2. Within the limits of perfect elasticity, instantaneous pressure produces twice the effect of that which is accumulative, whether the result be to produce deflection or fracture.

3. In regard to supports perfectly elastic in one direction, and perfectly flexible in the other, instantaneous action, at right angles to the axis of elasticity, produces a deflection which is to that of accumulative action as $\sqrt{4}$ to 1, whilst the tendencies to fracture are as 4 to 1. But should any case occur when the law of elasticity follows an extremely high power of the deflection, then the singular result will follow, that the deflections are the same, whether the force be exerted from the initial state or the state of load, but that the tendency to fracture will be immensely greater in the former case than in the latter.

4. In producing the fracture of natural substances, which all depart from the law of perfect elasticity as we approach the limit of fracture, the ratio of the effect of instantaneous and accumulative action will vary with the nature of the substance, never being less, for elastic bodies, than 2 to 1, nor for flexible than 4 to 1, and more usually approaching 3 or 4 to 1 for the former case, and 5 or 6 to 1 for the latter.

5. Let a vase or conduit be acted upon by a load which is alone sufficient to break it, and let this load be partly balanced by a small exterior force; should the great interior force suddenly cease, the small exterior action may crush the vase or conduit inward; its energy in such case being the sum of the interior and exterior forces.

6. Should the interior force be a vibration of the kind already explained, and should the exterior action be extremely feeble, and act on a very great mass, this extremely feeble action may crush the vase inward, with a power that shall exceed in any degree the enormous action of the interior or explosive vibration. The comparison of the interior and exterior actions is best effected in this case, by finding the modulus of elasticity of a material spring that shall coincide most nearly in effect with the interior tremor. For putting e and e' respectively for the modulus of the spring and of the support, and o and o$'$ for the deflections resulting from the tremor acting alone, and the re-action as it does act, we have $\frac{o'}{o} = \sqrt{\frac{e}{e'}}$, or, in other words, the deflection produced by the re-action, is to the deflection that would be produced by the interior tremor alone, in the inverse proportion of the square roots of the moduli of tremor and support.

7. Combining what is here said with the known laws of fluids moving in pipes, and whereby they necessarily produce hydraulic shocks, it follows, that any vessel connected with such a train of pipes, and plunged at some little depth in a considerable mass of water, or other heavy fluid, will occasionally be subject to a crushing and exterior force vastly greater than the interior strain due to the constant head of fluid.

In illustration of the principles thus developed, Mr. Bonnycastle details some experiments, and mentions a phenomenon which occurred under his own notice, and is analogous to the one described by Dr. Hare. In making experiments on the propagation of sound through water, he had occasion to cause an explosion of gunpowder within a hollow metallic cylinder, open at the lower end, and immersed under the liquid; and, although the strength of the cylinder was abundantly sufficient to bear the statical pressure of the surrounding water, he found it crushed inward after the explosion.

ON THE CONSTRUCTION OF VELOCIPEDES.

In an early number of our journal we alluded to the possible advantages that might be derived from on improved construction of the neglected velocipede. The subject has, we perceive, been taken up in other quarters. A correspondent of the *Mechanics' Magazine* makes the following suggestions of improvements in the instrument.

"The first velocipedes were introduced into this country from France upwards of twenty years ago, and the novelty of the machine excited a great degree of public attention at the time. The novelty soon passed away, and their use excited so much ridicule that they were speedily laid aside. This velocipede consisted of two wheels about 2½ or 3 feet diameter, connected by a pole, one wheel being in front and the other behind. The rider sat on a seat across the pole, and propelled himself by striking the ground alternately with his feet. The appearance of a man striding across a pole, it must be confessed, somewhat justified the ridicule which these machines ultimately excited.

"A second velocipede was introduced soon afterwards, invented by Mr. Sievier, which was of far superior construction and appearance. It consisted of two wheels of about 5 or 6 feet diameter, between which the rider balanced himself on a seat; it was propelled in the same manner as the former, and was constructed with a degree of lightness scarcely to have been expected. The public being tired of the matter, this machine was very little known, and has probably been forgotten.

"Various kinds of velocipedes have from time to time been presented to public notice, almost all of which have been constructed with an utter disregard of the most simple mechanical principles. Most of them have been propelled by turning a winch with the hand, and thus acting on the wheels. It has been entirely overlooked that mechanical labor is far the less efficient than the progressive power of the feet and lower limbs, so that it was far more laborious to move a mile with one of these machines than to walk five. It was also forgotten that the class of persons who would be likely to use velocipedes would be speedily fatigued by any kind of labor or motion to which they had not been accustomed. Every kind of velocipede hitherto introduced has therefore remained a useless toy.

"The subject is, however, by no means exhausted, and due attention to certain practical principles would enable a velocipede to be constructed of some real and practical use. Having paid considerable attention to the subject when they were first introduced, with a view to their improvement, I will detail the result of my inquiries.

"It appears that a very important power of producing motion has been entirely overlooked, or has been very inefficiently applied. The average weight of a man is about 140 or 150 pounds, and this, judiciously applied, would give a power nearly equal to the average draught of a horse in drawing a light carriage.

"Let a carriage be constructed with two wheels of 5 or 6 feet diameter, and with a third wheel of smaller diameter placed behind, moving on a pivot, as in a garden chair.

"The axle of the front wheels is to be cranked, and to these cranks stirrups are to be attached, on which the weight is to be thrown alternately. The motion has too much of the treadmill character to be agreeable, and this carriage could only be used to enable a man to carry an invalid for exercise, for which purpose a light seat behind would be required, and also four wheels instead of three. To render this motion agreeable, it could be contrived so as to resemble the exercise of riding on horseback. The stirrups are to be placed on the same crank, and the rider is to throw his weight alternately from the seat to the stirrups. The seat is to be shaped like a saddle hinged in front, and with a powerful and elastic spring under the back part. When the rider leans forward, great part of the weight is taken off the seat, which throws him forward with his weight on the stirrups. By these means the fatigue of continually rising from the seat is prevented, the action resembling that of rising in the saddle when on horseback.

"A third stirrup fixed on an opposite crank for occasional use would enable the first-described mode of progression to be used at pleasure, or when greater power was required.

"I will now describe that kind of velocipede which I believe to be superior to any other with which I have become acquainted, and which I believe is capable of being rendered of considerable practical utility. It is but a slight alteration on the plan of Mr. Sievier already described. Two wheels of about 6 feet diameter, of the lightest possible construction, are to be placed between 3 and 4 feet apart, connected by an axle board forward, and carrying a seat properly balanced, and raised a proper height. From both the back and front of this seat a bar is to pass obliquely downwards. At the end of each of these bars a wheel is to be placed of from 12 to 18 inches diameter. These wheels are to reach within 6 or 8 inches of the ground.

"The rider is to have two stilts made of bamboo, or other very light material, extending from 18 to 30 inches below the feet; they are to have flat stirrups to support the feet, and to be properly arranged in construction.

"It is obvious that each step of the rider would carry him many yards, and the action would not be fatiguing, as he would balance his weight in the intervals. The two small wheels are merely safety wheels, as the rider losing his balance would immediately rest on one or other of these wheels.

"A carriage of this description would enable a person to travel on a level road from 12 to 15 miles an hour. It would be of infinite value in such weather as we have had this last winter, or on the frozen canals of Holland, and on a railroad, the wheels being adapted to the rails, information would be enabled to be conveyed from one point to another with the speed of a steam-engine.

"By having four wheels it could also be used for taking out a lady, or invalid, for exercise.

"I have omitted some minute details of construction which would not interest the public, but if your correspondent requires more detailed information, I will forward it in any way desired."

DURATION OF LITERARY COPYRIGHT IN DIFFERENT COUNTRIES.

In Prussia, the exclusive right of publication is guaranteed to authors during their lives, and to their heirs for thirty years afterwards. This refers only to literary works. In works of art, plays, or music, the duration of copyright extends only to ten years after the author's death.

In the Germanic Confederation, literary productions of all kinds, even works of art, are protected for ten years; but this period may be extended to twenty in favor of large works, requiring much labor and expense. The Germanic Confederation intend, however, to take the subject into deliberation next year, with a view to extend the minimum duration of copyright in literary works.

In Russia, any author or translator of a book has the exclusive property in the work during his life, and his heirs or assigns for twenty-five years subsequent to his decease.

In Belgium, the right is conceded to the author during his life, and to his widow and his heirs during their lives; but all right terminates after the death of the first generation of the author's heirs.

In the Pontifical States, by an edict dated in 1826, authors and artists have the exclusive right to publish their works during their lives, and their heirs for twelve years after their death.

In the United States, by an Act of Congress, dated in 1831, the copyright, which previously only lasted for fourteen years, was extended to twenty-eight years, with the right to further extension for fourteen years if the author should survive the first term.

In England, by the Act of 1814, the copyright in literary works was extended to twenty-eight years, to the author and his assigns; and if at the end of that time the author survive, the copyright is extended for the rest of his life.

BOURNE'S PATENT FOR THE CONSUMPTION OF FUEL.

We noticed in a former number the decision of the Master of the Rolls in the important case of the claim of Mr. Bourne against the Peninsular Steam Navigation Company; we are now enabled to give a correct copy of the judgment in this cause.

BOURNE *v.* THE PENINSULAR AND ORIENTAL STEAM NAVIGATION COMPANY.—JUDGMENT.

The Master of the Rolls.—This is an application made by the plaintiff, to restrain one set of defendants from executing bills of sale for certain vessels, and to restrain another set of defendants from accepting any such bills of sale, and also to restrain the defendants from substituting any other machinery and apparatus than the plaintiff's in their vessels. It seems that the plaintiff is the owner of certain patent rights which he has obtained for an invention by which fuel is to be consumed in various ways which are pointed out. One of the modes in which fuel is to be consumed has been particularly, and is alone, the one necessary to discuss on the present occasion; it is to economise the consumption of fuel by separating the parts of which the fuel consists into distinct portions, by a process of distillation, and afterwards to consume those products by means of combustion, it being alleged that is a mode of obtaining a complete combustion, and thereby economy of fuel. This patent was obtained in the year 1838; it bears date the 8th of October; the patent was the subject of experiments, in which experiments it is said to have succeeded. Certainly the invention appears to me to have been a very ingenious one, and without being able at all myself to judge of its practical operation and effect, I may, without difficulty, or without prejudice to this case on any side, suppose, that that must have been a successful mode of producing the effect he desired to produce. He being the owner of this patent invention, it was tried on board a ship called the *William Fawcett*, which belonged to some of the defendants in this case, and that experiment is said to have succeeded. How the particular apparatus which was used on that occasion did produce that successful effect I own I do not understand from any of the explanations which have been offered to me. I must assume that, to a certain extent, at least in that experimental trip, it was successful. After this had been done, the plaintiff entered into the agreement which has been the subject of so much discussion in this case with some of the defendants, and by that agreement it was provided, that he should within six months from the date thereof well and effectually apply or cause to be applied his invention to the steam-engines or machinery of all or such and so many of the steam vessels or ships called the *Tagus*, the *Braganza*, and the *Royal Tar*, or of such other steam-ships or vessels as may hereafter belong to Richard Bourne or the other persons named, or as they and the Peninsular Steam Packet Company might desire, at an expense not exceeding £120 for each ship or vessel not exceeding the power of 260 horses, and others in like proportion. This agreement contained many special provisions, and in pursuance of it the plaintiff proceeded to make certain alterations with the authority of the defendants, Richard Bourne acting for the others, it seems. He proceeded to make alterations in those vessels which were specified in the agreement, and also in the vessel called the *Liverpool*, which is not mentioned in the agreement. He alleges that he did apply, if not actually the invention which he had specified, at least that which he ought to have been understood to have contracted to apply, the principle of his invention; and he says he ought to be understood as having done so, because the words "principle of his invention," occur more than once in the course of this agreement. He has applied the principle of the invention in such a way as it could be applied to the peculiar construction of the furnaces and boilers of the vessels into which he introduced it. He says that he has actually done it as to the two vessels, the *Royal Tar* and the *Braganza*. As to the *Royal Tar*, the alterations were completed on the 31st of July, 1840, and as to the *Braganza*, on the 14th August, 1840.

Mr. Pemberton.—As far they were enabled.

The Master of the Rolls.—Yes; and as to the rest, he was willing to go on if they would have permitted him to do so, but they did not permit him to do so; and he says, that they have determined to defeat his rights under the contract, and as one of the means of defeating his rights under the contract they have contracted to sell these vessels to the defendants, who were afterwards constituted a corporate society or company, and therefore it is he prays the injunction I have mentioned to restrain the transfer. I do not think that those who constitute this company have under the circumstances any peculiar right On the

other hand, it must be constantly borne in mind that it is proved here, that at the time when the contract was entered into the plaintiff knew that an alienation was intended, and there are portions of this agreement which clearly show it was in the contemplation of all parties, I think, at the time the contract was entered into. I think it must also be agreed that the real object of these parties was not to apply, and that the plaintiff never contracted to apply, the particular apparatus which was specified to the vessel; it would have been manifestly absurd for auy body to attempt to do any such thing, and that really it was intended to apply the "principle;" and I do not think there is a material difference between the parties as to what was intended to be the principle. It was to obtain from the raw coal those volatile products which might afterwards be completely consumed by means of hot burning coke, and thereby produce an entire combustion of all the fuel, and produce ecouomy in that way. It comes therefore very much to be a question of fact here, first, what was intended to be done, and then what was done, and then whether what was done was so done, aud in such a way, as to make it incumbent on the defeudant to persevere still longer in permitting the plaintiff to make those experiments, if they may be so called, which he had begun. He was to be at liberty then, or he was requested, to make these alterations. He proceeded to make them, and the intention was to have a distillation of coal and combustion of the products; there was certainly something very like it iu the *Fawcett*, previous to the agreement being entered into. I confess it does not appear to me that there was any thing like it attempted in any of the other vessels, so far as the plaintiff had proceeded in his operations. Looking at the principle as exemplified, and I look at it only as exemplified in the specification, for the production of the distillation of coal the application of a great amount of heat is necessarily required; that apparatus was so arranged that the furnace burning under the ovens which contained the retorts was, so placed as to produce certainly a very great quantity of heat for the heating of the retorts, and the fuel contained in the retorts; and the arraugement was so managed that by the communication of pipes the volatile products, as they are called, come down into the same furnace to be there consumed. Now something or other analogous to that was required, in order that there might be the process of distillation and the process of combustion, and the two so uuited as to produce the effect desired. Now whichever of these things is looked at, as far as was actually done, there is really nothing, as far as I can understand, to be of that kind; they were all attempts, all contrivances to produce combustion, and not distillation, in the first instance, and contrivances so managed as that the volatile products, the result of combustion, might be carried through fuel probably in a higher state of combustion, and by that means more effectively consumed than they otherwise would be. That at least appears to me to be the effect of what was done in the *Royal Tar*, and the effect of what was done in the *Liverpool*, and also the effect of what was done, or intended to be done, in the *Tagus*. Difficulties arose in the execution; those difficulties were attempted to be met by contrivances, which were not within the patent invention, by coating the boilers, by producing draughts of air, and I think by some other contrivances. The object was to produce a great draught of air, and to pass the products of combustion through fuel in a higher state of combustion than that of the fuel which produced the products, if I may use that expression. Those experiments were made for a considerable time. The experiments were made, and the contrivances were used, to get rid of the inconvenience which arose, as I think it clearly appears from the evidence, in the management of the vessels; the consequence of which was, that it seems to me there was a good reason on the part of the defendants to say we will not go on in this way. Then comes the question, had the plaintiff a right to insist on it? Now I apprehend that a person who enters into an agreement of this sort, in which he agreed within a certain number of months to apply a patent invention, or the principle of a patent invention, to a particular purpose, intends, two things. First of all, he intends to have it uudcrstood that he has the means in his possession of forthwith applying that principle; and next he must be understood to mean this—that when he has applied the principle under the contract, he has given to the persons who contracted with him an exclusive right to something which otherwise they would not have been entitled to. Now on both these points it appears to me the plaintiff has failed. He was not ready at the time to apply the principle of his invention in this way. It is perfectly obvious, that, possessed as he was of great ingenuity and resolution and perseverance, he was desirous of applying this ingenious, and, if it could be made practicable, this very useful invention. In this way he did make various attempts at a trial; but the very circumstance of his changing from time to time his mode of operation, not simply in a manner required by the particular construction of the boilers or the furnaces on board the particular vessels, but evidently for the purpose of reducing his principle to a practical effect in that way, shows he was not in possession clearly of the means of doing that; and though there was a material saving effected in the consumption of fuel, there does appear the strongest reason to think that saving, if not altogether, at any rate was in a great measure, effected by the application of means which were open to all the world to apply. It is under these circumstances he comes now to have an injunction to restrain the parties from alienating those vessels. I think he is not entitled to that iujunction. I hardly think he would be entitled to that injunction under the facts which appear to his knowledge of the intention to alienate at the time. He never intended there should be any restraint of alienation. He intended to rely on such rights as he might have to an account and a share of profits, as to which I say nothing; and I do not think it is at all necessary for me to enter into the nature of the agreement for this purpose, because I must refuse this injunction, on the ground that the plaintiff does not appear to me to have had the means at that time of applying this invention in the way that was intended; and that the experiments which he made towards that end failed, so that these defendants never had that which they contracted to have from him.

BRITISH PATENTS.

ENGLISH EXPIRED PATENTS.

Bennett Woodcroft, of Manchester, for *methods of printing and preparing yarns of cotton, silk, wool, &c.*, March 31.

Henry Asprey Stothert, of Bath, for *improvements on ploughs*, April 4.

John Paterson Reid, of Glasgow, for *improvements on power-looms*, April 4.

Joseph Tilt, of Prospect-place, Southwark, for *improvements in salt-pans, and in the mode of applying heat to brine*, April 4.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 212.)

Frederick Payne Mackelcan, of Birmingham, civil engineer, for *certain improved thrashing machinery, a portion of which may be used as a means of transmitting power to other machinery*, April 1.—The first claim is for the horse engine employed for actuating the thrashing machine. It is composed of a frame, in which is a vertical axis, with a cross-head at top, and a pole bolted fast to it for the horse to draw by, having a counterpoise weight. The vertical axis carries a spur-wheel, that drives a pinion on a separate axis, on the lower part of which is a large heavy pulley, acting as a fly-wheel by its weight, and carrying a band that drives the machinery. The large pulley is not keyed to its axis, but is carried forward by a ratchet wheel and "paul" immediately above it; this allows the poise to stop or go backwards without injury to the machinery, as the ratchet acts forward only, and runs free when reversed.

Claim second.—Hinging the bed of the thrashing machine in the line of tangent to the centre part of the concave.

The bed of the thrashing machine is hinged to the back posts of the framing, so that a line drawn from the hinge should be a tangent to the centre part of the arch formed by the concave-fluted surface of the bed. In the operation of thrashing the corn is pushed into the mouth of the machine, and is immediately struck upwards, and carried by the beaters along the fluted surface of the concave, after which it is thrown out upon the floor. In case too large a mass of straw should be introduced, or an improper substance that could not pass in the space allowed between the drum (which is hexagonal) and the concave, the bed, which is kept down by its weight only, rises, by turning on its hinges, and affords a larger pace.

Claim third.—The endless band as a moving feeding table.

A pair of rollers of the usual construction are placed close to the mouth of the machine, the lower one is driven by a band from the drum spindle, and the two rollers move together by means of a pair of pinions attached to one end of them. At the entrance end of the feeding table is another roller, round which an endless band of the width of the feeding table passes, and thence round the lower roller at the mouth of the machine. The band when in motion carries the corn into the mouth of the machine.

Claim fourth.—The drum and concave studded with large headed nails.

In the thrashing of barley and other unbound grain, the patentee prefers to use a cylinder (in place of the hexagonal drum) and concave studded with large headed nails.

William Horsfall, of Manchester, card-maker, for *an improvement or improvements in cards for carding cotton, wool, silk, flax, and other fibrous substances*, April 1.—The patentee claims generally, as his improvements in cards, the making the backs or foundations thereof, firstly, of thick woven cloth, made of fine sheep's wool shot upon a warp of flax, hemp, or cotton thread, and coated; or, secondly, of a thick cloth, composed altogether of wool, and covered with a web of thin smooth cotton or other suitable fabric cemented thereto, and whether such backs or foundations are so coated or covered on one or both sides.

To make the first-mentioned of these backs, the patentee uses a thick woven cloth, made of fine sheep's wool shot upon a warp of flax, hemp, or cotton thread, milled and fulled up to the thickness herein-after mentioned, and well shorn on both sides.

For the medium sort of cotton cards, this cloth should weigh from 26 to 28 ounces per square yard, and for the medium sort of flax cards, 36 ounces per square yard. For the finer sorts of each of these descriptions of cards, the cloth should weigh a few ounces less, and for the coarser sorts a few ounces more.

The patentee first gives the cloth a priming, composed of water, whitening, and well-boiled linseed oil, using as much whitening as the water will hold suspended, and adding no more oil than is necessary to make the mixture spread easily without running; or, instead of this, the patentee uses a composition called by painters "distemper," made of weak size mixed with ochre. When the priming is dry it is brushed over with a weak size, in order to dampen it, and the cloth is then rubbed down with pumice stone to remove any roughness which may remain on the surface. If the cloth is not now sufficiently primed, a second coating is given it, and when dry is again rubbed down with pumice stone. A coating of linseed oil boiled to the consistence of thick cream is now laid on evenly

over a cloth, and the cloth set to dry; the drying may be expedited by subjecting the cloth to a temperature of about 180° Fahrenheit.

A good coating of coarser sorts of cards is composed, of one pound of soap, dissolved in six pints of water, mixed with one cwt. of any oil paint; or a coating may be made of glue and treacle or molasses, in the proportion of one part of glue to two parts treacle, with the addition of a little boiled linseed oil.

To make the second of the before-mentioned improved backs, a cloth is employed similar in weight and thickness to that before mentioned, but made wholly of sheep's wool, and to one or both sides of it is cemented a web of thin smooth cloth of cotton or any other suitable material, a cement made of glue and treacle being used for that purpose.

The wires are inserted into and secured in the backs of the foundation by the usual machinery.

George Ritchie, of Gracechurch-street, London, and Edward Bowra, of the same place, manufacturers, for *improvements in the manufacture of boas, muffs, cuffs, flounces, and tippets*, April 1.—Claim first.—The mode of packing or filling boas, muffs, &c., with air.

The skin or outer fabric of which the boa is to be made being properly prepared, small bags filled with air, about four inches long by two inches in diameter, according to the size of the boa, are placed within the central part thereof, and closed over in the ordinary way.

The patentees do not confine themselves to the use of small bags containing air, as small inflated india-rubber balls may be substituted for them, or the whole of the inner part of the boa may be made air-tight and inflated.

Claim second.—The mode of applying double cuffs to the wristbands of shirts.

This part of the invention consists in applying a double cuff to the wristband of a shirt, one of which is made to turn under during the time the other is being worn. By this means two cuffs can be exhibited on one shirt.

Thomas Joyce, of Manchester, ironmonger, for *a certain article, which may be used as a handsome nob for parlour and other doors, bell-pulls, and curtain-pins; and is also capable of being used for a variety of useful and ornamental purposes in the interior of dwelling-houses and other places.*—April 1. This invention consists in the application of a mirror in the making of knobs for parlour and other doors, bell-pulls, curtain-pins, or knobs for the like purposes, the mirror being applied to the end or most visible part of such knob, within a recess or cavity, and surrounded by a prominent border, in order to protect it from injury.

William Henry Fox Talbot, Esq., Lacock Abbey, Wilts, for *improvements in producing or obtaining motive power.*—April 1. This invention consists, firstly—In a method of obtaining motive power, by the alternate evolution and combustion or explosion of gases; the evolution being caused by the decomposition of a liquid by a voltaic current, and the combustion being also caused by a voltaic current.

Secondly.—In an improvement in electro-magnetic engines, by stopping the armature itself by the magnet, and the disengagement at that moment of the rest of the mass in motion.

Thirdly.—In a method of obtaining motive power, by the pressure of gas or liquid, or the vapor of a liquid, or any of these combined, such pressure being caused by heat communicated to them internally, and then withdrawn or diminished at regular intervals by means of a voltaic battery.

James Stirling, of Dundee, engineer, and the Rev. Robert Stirling, D.D., of Galston, Ayrshire, for *certain improvements in air-engines.*—April 1. Claim first.—The employment of strips or rods of glass for receiving and imparting heat, during the passage of air from the hot to the cold chamber, and *vice versa*.

Claim second.—The formation of the glass, iron, or other materials employed for this purpose, into continuous plates, strips, or rods of considerable length, having their contiguous surfaces so placed as to make all the passages for the air narrow, and in a line parallel, or nearly so, with the axis of the plate, box, or driver.

Claim third.—The mode of constructing air-engines, whereby the air in passing from the heated end of the air-vessel to the cool end thereof, is caused to pass first amongst an extensive system of surfaces to give off heat thereto, and then to pass amongst an extensive cooling apparatus cooled by the passage of fluids, whereby the air in returning from the cool end of the air-vessel to the heated end thereof is caused to pass through the same extensive system of surfaces, and having taken up heat from those surfaces to pass into the heated end of the air-vessel.

Claim fourth.—The use or application in air-engines of cupped leather collars around the piston-rods, or other rods which communicate with the interior of the engine, by which means the air is enabled to be confined at a higher pressure.

The air-vessel of the air-engine is formed of the best cast-iron, and is connected by a port and pipe with the top of a cylindrical vessel, also of cast-iron, called the plate-box. The lower part of the air-vessel also communicates with the plate-box by means of three or more parallel pipes, which at their entrance into the air-vessel have their mouths widened, and covered with a fan-shaped plate, which is intended to spread the air with great velocity over the whole extent of the spheroidal bottom of the air-vessel.

An air-tight vessel of cast iron, called "the driver," occupies five sixths of the air-vessel, and in order to prevent the heat from rising upwards, the driver has a plate of cast-iron fixed to its bottom on the outside, and in its lower part is placed a quantity of pounded bricks or other imperfectly conducting substances; the remainder of its interior is divided by thin plates of iron into twelve or sixteen compartments. The driver is made to fit the bored part of the air-vessel, so as to be easily moved up and down, but at the same time to prevent the air passing by its sides; its top and bottom are also formed to fit the top and bottom of the air-vessel. It is moved by a turned and polished rod working through a leather collar, which is made by wetting and pressing it in a mould into the form of a cup, and then cutting off the bottom. This collar is fixed upon the top of the air-vessel, into which also a pipe is soldered which descends into a vessel of oil, so as to prevent the air from getting across to the collar, and thus to keep it air-tight.

Two thirds of the plate-box from the bottom are filled with plates of sheet iron placed perpendicularly, and kept at a distance of 1-50th of an inch from each other by ridges. The remainder of the plate-box is occupied partly by a cooling apparatus herein described, and partly by blocks of iron-glass, or other bodies perfectly solid. The cooling apparatus consists of a great number of copper pipes, arranged in twenty-seven horizontal rows, of which each alternate row has one pipe less than the other rows, in order that its pipes may be placed opposite to the interstices of those rows. The pipes are kept at a distance of 1-20th of an inch from one another in every direction, being soldered into two plates of brass, and to these two other plates of brass are soldered, having horizontal passages at all their four margins for connecting the ends of the pipes, and returning the water from one end to the other, and having larger passages for introducing and taking off the water.

The main pipes pass through holes in the cover of the plate-box, and are made tight by rings of lead screwed firmly at the joints.

The following is the mode of operation:—The bottom part of the air-vessel, the parallel pipes, and the bottom of the plate-box, are heated by a fire placed beneath them, until the soot is burnt off, and the coal smoke ceases to adhere. When the apparatus is thus brought to its proper temperature, if the driver be moved upwards it will diminish the space at the top of the air vessel, and enlarge the space at the bottom by an equal quantity; a portion of air is thus made to pass downwards through the plate box into the hot part of the air vessel, and being thus heated and expanded it is more than sufficient to occupy the whole increase of space produced at the bottom by the motion of the driver, and the surplus must be forced outwards at the port. On the contrary, when the driver is moved downwards, a quantity of air is made to ascend through the plate-box and cooling apparatus, and being thus cooled and contracted, it is not sufficient to fill the increased space produced at the top, and a quantity of air must enter by the port to restore the equilibrium.

One of these air vessels is placed at each end of the working cylinder of the air engine.

A different kind of driver is shown, which consists of an outer shell or cap of cast iron, accurately turned and fitted to the air-vessel, and having its bottom pierced with a number of holes which are intended for the passage of air; upon the bottom of this shell rests a piece of cast-iron, also pierced with holes, communicating with those just mentioned. This piece of cast iron has small ridges upon its upper surface to support a number of plates, and facilitate the distribution of the air in them; these consist of alternate sheets of plain and fluted glass, divided into narrow slips not exceeding one inch in width, which accurately fill up the interior space of the driver; the edges of the fluted glass preserve passages for the air between the adjacent plates.

At a small distance above these plates is the cover or head of the driver, which is perforated with small holes for the transmission of air, and which is attached to the outer shell by a ring of sheet iron.

From the centre of the driver a turned and polished rod ascends through the cover of the air-vessel, and is kept air-tight by the leather collar, &c., before mentioned.

The cooling apparatus consists of a number of concentric plates or rings, through which a stream of cold water circulates.

Instead of the plates of plain and fluted glass just mentioned, cylindrical rods of glass may be employed; and instead of iron plates, glass rods, or alternate plates of plain or fluted glass, may be used in the plate box.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 12th of June.

Henry Bridge Cowell, of Lower-street, St. Mary, Islington, ironmonger, due June 2.

James Robinson, of the Old Jewry, manufacturer of machinery, due June 2.

FOREIGN INTELLIGENCE.

FRANCE.

THE COPYRIGHT BILL.

This bill, having already passed the Chamber of Peers, has been discussed by the Chamber of Deputies at many sittings. The bill seemed to excite unusual interest, and the extension of the law of copyright appears to have as strenuous opponents in the French Chamber of Deputies as in the English House of Commons. The existing law, however, is much more favorable to authors than the law of copyright in Englaud. The law of 1793 gives to authors the copyright in their works during their lives, and to their heirs for ten years after their deaths. The law which has been under discussion, would have extended the term after death to 30 years. It had, indeed, been proposed to extend

it to 50 years, but this proposition was rejected, and thirty years seemed to be the period generally agreed on as a term that would fully meet the justice of the case. One of the objectors to the measure, M. Portalis, was for abolishing all copyright whatever, on the plea that as public speakers have not the exclusive property in their works, public writers ought not to have exclusive property in their writings. Some of the opponents to the bill wished to throw odium on the measure, by endeavouring to make it appear that under "works of art" were to be included all models, vases, clocks, and other articles of that description. M. de Lamartine, who has been an eloquent advocate in support of the rights of authors, explained that the bill only referred to literary works, and those works generally understood as works of art, and not to articles manufactured, respecting which the Minister of Commerce intended to bring in a separate bill. The discussion was adjourned from the 26th of March to the 2d of April, when, after all the articles had been discussed, and all amendments which militated against the principle of the bill had been rejected, the Chamber proceeded to vote on the *ensemble* of the bill. The measure was then *negatived* by a majority of 154 against 108. This extraordinary result, after so long a discussion in both Chambers, during which the majorities were in favor of the separate articles, appears difficult to account for.

The *Journal des Debats*, in noticing this decision, observes, "such is the result of this long and laborious discussion to which the Chamber devoted ten long sittings. If by this vote the Chamber only desired to exhibit the extent of its inability, and to declare its incapacity to make a good law for regulating the rights of authors, we should be sorry to contradict it; we are, on the contrary, entirely of that opinion. We have never seen a discussion so barren, so sterile, as this proved. We do not believe that any theoretical legislative question has ever been treated in a manner so feeble, so dry, so unconnected, so little worthy of the subject matter. The object, indeed, was nothing less than to regulate the rights of intelligence; to advocate the claims of mind and talent; which ought at least to be recognised in an age wherein they effect so much for the general and most important interests of mankind."

The most feasible objection urged to the bill, and which was probably the cause of its rejection, was the obstacle it might create in the proposed arrangements with foreign governments to prevent literary piracy. It was felt that the bill if carried would have the effect of preventing diplomatic negotiations for the purpose of preventing the republication of the works of authors in neighbouring countries without their consent, by which practice popular authors are at present seriously injured.

ACADEMY OF SCIENCES.

At the sitting of the Academy of Sciences on the 29th ult., M. Payen presented the following analysis of the water from the Artesian well of Grenelle. In 100 litres of the water there were found 14 grammes 30 centigrammes of residuum, which consisted of the following substances:—

	gr.	cent.
Carbonate of Lime	6	80
Carbonate of Magnesia......	1	42
Bi-carbonate of Potash......	2	96
Sulphate of Potash	1	20
Chloride of Potassium	1	9
Silex and Organic matter....	0	57
Peculiar Yellow substance ..	0	2
Organic matter and Azote ..	0	24
	14	30

The same quantity of the water of the Seine leaves 18 grammes 5 centigrammes of residuum.

M. Libri presented a paper from M. Jargioni Jozzetti, professor of chemistry and botany at Florence, on the mineral waters of Bapolano. In this paper M. Libri announces, that in the chemical analyses he had made of these waters he could not detect any iron; nevertheless he found that metal existing in the *oscillaires*, animalculæ, which live in the water, and which could not apparently obtain it from any other source. The iron contained in these *oscillaires* accumulates by little and little in the stony deposits which are formed round the cavities in which the waters are contained, in such a manner that its presence can be easily proved by chemical analysis. This singular fact serves to enlarge the field of inquiry that has been lately entered, relative to the influence which very small organised bodies exercise in the formation of certain mineral substances; a new and important question from which most probably will be derived new ideas respecting the constitution of bodies, and which have led M. Dumas, in his remarkable lessons on chemical philosophy, almost to defend the speculations of the alchemists, and to admit the possibility of the transmutation of metals.

M. Melloni read a memoir on the cause of the difference observable in the heat-absorbing powers of plates of polished and unpolished metals, and on the applications or improvements of reflectors of heat. It has been long known that a metallic plate with a rough surface becomes sooner heated when exposed to the influence of radiant heat than a plate of the same kind of metal that is brilliant and polished. On the other hand, it has been also proved that a coffee-pot filled with hot water becomes sooner cool when it is tarnished and dull than when the surface is perfectly bright. These facts have led philosophers in general to admit that the small points, or superficial asperities on the surfaces of bodies, augment their powers of absorbing and emitting heat.

M. Melloni does not dispute these facts, which are quite correct, but he endeavors to show that the cause of them has been misunderstood. The result of his experiments, in fact, goes to prove that the cause of the difference in the power of absorbing and emitting heat by the same metal depends entirely on the condition of its structure; in its greater or less degree of hardness for example. He has succeeded in altering, at will, the heat-absorbing or emitting property of a metallic plate, independently of any roughness or change in its surface, by making it harder and more elastic. Now it is probable that some effect of this kind is produced when the surface of a metal plate is roughened; by the file or the emery employed for that purpose the arrangement of the molecules is changed by the kind of disturbance thus given to them. It is the explanation hitherto given of the circumstance by philosophers, and not the fact itself, that is disputed by M. Melloni.

A new microscope was presented to the Academy by Dr. A. Donné, which is specially adapted for medical men, to enable them to examine immediately, and at the bed-side of their patients, the nature of a substance or of a morbid product which it may be interesting to know. It is, in fact, a pocket microscope, with nothing peculiar about it, only it is contrived so as by its simplicity and cheapness to extend the use of this instrument in medical investigations. It is proposed by the contriver of this pocket instrument, to render the microscope as useful in the observation of disease as it has been latterly rendered in the study of natural history and physiology. Within the last fifteen years many distinguished French physicians have applied the microscope in the detection of disease, and in studying its character, and any adaptation of the instrument to that purpose like that of Dr. Donné may be the means of extending the application of it in medicine.

NAVIGATION.

Letters from Strasburgh of the 23d of March state, that the works of the canal from Strasburgh to the Rhine have been continued without interruption; and are almost completely finished. A first attempt at navigation took place in last October. Nothing now remains to render the works complete but to finish the termination of the canal in its entrance into the Rhine. They are engaged in this work at present.

The investments in the savings-banks of Paris, on the 4th and 5th inst., amounted to 768,762f., and the withdrawals to 603,000f.

We find in the *Journal des Debats* a letter from Angers, of the 2d, mentioning that an immense float of timber for the Royal navy had passed at Ponts-de-Ce on its way to Indret. Since the wars of the empire so large a quantity of timber was not remembered to have descended the Loire, and still, adds the correspodent, it is not one-fourth of the contingent which is to be supplied by the country washed by that river. This timber was intended for the construction of the Transatlantic steamers, which are to be completed before the latter end of the year.

BELGIUM.

The Antwerp *Journal du Commerce*, alluding to the statement in the English papers, that the steam ships President and British Queen had been purchased by the Belgian Government, observes:—"We are informed that the purchase has been really effected, not by the Belgian Government, but on account of a company that has undertaken the responsibility of Transatlantic navigation, the offers of which company have been accepted. The price to be paid for the two ships is stated to be £170,000 sterling. The purchase of one of the ships (the British Queen) is definitely settled; the purchase of the other, which is on her voyage home, will depend on further proof of her capabilities. [We suspect that the delays attending the voyage of the President will prevent the Belgian company from completing their bargain].

A royal decree of the King of the Belgians, of the 24th ult., authorises the formation of a railroad to the coal mines at Courcelles, for the purpose of facilitating the conveyance of coal from those mines by the canal of Charleroy to Brussels. The permission to form this railway is given to the company to whom the collieries of Benne-sans-Fosse belong, but it is not to be exclusively devoted to their service. Any other company deciding to make use of the railway may do so on paying a reasonable toll.

By another decree of King Leopold, dated March 30th, the administration of the railroads in Belgium is made a separate department of the government, under the title of the Direction of the Administration of Railroads (*Direction de la régie du Chemin-de-fer*). The chief officer charged with this branch of the public service is to be called the Director of the Administration of Railroads, and he is to communicate directly with the Minister. All the inferior officers are to be placed under his control; the number of whom however is to be fixed by the Minister. The King retains the appointment of the director, the comptrollers, and their assistants.

GERMANY.

The German papers contain the following announcement:—"The Germanic diet at Francfort is paying great attention to a recent invention of M. Wagener's, mechanician of that town, the object of which is to substitute electro-magnetic power for steam, in the locomotives employed on the railroads. The president of the diet, Count Munch-Bellinghausen, has submitted a proposition to the assembly suggesting that the invention in question should be purchased by the Germanic Confederation, and that all the states which compose it should contribute to defray the expense proportionately to the extent of their territory. The inventor has valued it at the moderate sum of 100,000 florins, (about 250,000frs.), so that Austria for instance would have to pay 33,000 florins, Prussia 27,000 florins, and so on to the rest.

"The diet appointed a commission composed

of three of its members to examine the invention of M. Wagener. The report made by this commission concurs in the adoption of the plan proposed by Count Munch-Bellinghausen. Some of the states have agreed to the proposition; and others have not yet come to any decision upon the subject.

"In this state of things, the Austrian government has commissioned Count Munch-Bellinghausen, their representative at the diet, to announce that in case it should not decide to purchase the invention in question, the Austrian government will become its exclusive proprietor. Should this alternative be adopted, it remains to be known if our government will make this invention public, or if it will be granted to the proprictors of railroads. It is certain that Baron Rothschild and Baron Sina, who are two of the most extensive proprietors of the Austrian railways, have likewise signified their intention of becoming joint purchasers of M. Wagener's invention."

A vessel employed to keep up the communication across the Danube, while tho pontoon bridge is under repair, struck, on the night of the 19th ult., against one of the pontoons, and was upset. There were 30 passengers on board, nearly all ef whom perished.

M. Bessell, a German astronomer, has made one of the greatest discoveries of modern times, by having ascertained the parallax of the double star 61 Cygni. He found, from repeated observations, made from August, 1837, to March, 1840, that the parallax of Cygni did not exceed 31 hundredths of a second, which places the distance of that star from us at nearly 670,000 times that of the sun, or which is nearly 64 millions of millions of miles (or more nearly, 63,650,000,000,000 miles). This immense distance can better be conceivod when we state, that if a cannon-ball were to traverse this vast space at the rate of 20 miles a minute, it would occupy more than 6,000,000 years in coming from that star to our earth; and if a body could be projected from our earth to 61 Cygui at 30 miles an hour (which is about the same rate as the carriages on railroads travel), it would occupy at least 96,000,000 years. Light, which travels more than 11,000,000 miles in a minute, would occupy about 12 years in coming from that star to our earth.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

South-eastern and Dover Railway.—The stupendous works of this railway between Dover and Folkestone, have been actively resumed this spring by a large force of workmen. The line lies along the sea shore, and is formed either by boring tunnels through the taller cliffs themselves, by embankment on their ledges, or by cutting to the level in the crowns of the less formidable eminences. It is by no means Utopian to conjecture that this most important railroad will be available to tho public in a couple more years, and perhaps sooner, as we understand the shareholders' list now comprises many of the most substantial and enterprising men of the day. Shakspere's Tunnel, as it is called, from its running through the cliff of that name, a double tunnel, the most extensive of the whole line, twelve months since had been carried through the cliff, and the Herculean task of arching it over where the chalk is considered insecure is rapidly progressing. The sea walls, the cuttings and tunnelling beyond, towards Folkestone, are also in a forward state, while the other parts of the line at its London end are also proceeding vigorously.

The Great Western Railway.—This railway will positively be opened to Cirencester on the 26th instant. The journey from Cheltenham to London will then be performed in four hours and a half. Not many years since the samo journey occupied two days.—*Wiltshire Independent.*

Northern and Eastern Railway.—An adjourned meeting of the committee was held in the Council Chamber on Wednesday week. It was stated, that an arrangement had been made with the Lee river trustees, by which all opposition on their part had been overcome; and that no opposition had ever been contemplated by the Governors of Christ's Hospital, many of whom were decidedly in favor of a terminus at Hertford, as closely connected with the town as possible on account of the facilities which would thus be afforded to the friends of children visiting the school.—*Essex Mercury.*

Bristol and Gloucester Railway Extension Line.—The annual general meeting of the shareholders in this undertaking was held on Tuesday week, at the White Lion Inn, Broad-street, Bristol, George Jones, esq., in the chair. The report announced that the whole of the deficient capital has been subscribed, and that the directors are endeavoring to apply to the execution of the works all the energy which that pleasing fact is calculated to draw forth. They have succeeded in purchasing about one half of the distance of the whole line, and contracts have been satisfactorily entered into for the construction of the tunnel at Wickwar, and the cuttings north and south of it. A further call of £2 10s. per share is made to enable the directors to proceed with all the expedition practicable, in the execution of the works. Tho "formation of a terminus at Bristol, in immediate connection with the Great Western and Bristol and Exeter Lines," there to facilitate the transit of goods on the other railways, is under consideration. The report was adopted, and thanks were voted to the directors.

Bristol and Exeter Railway.—The several contracts for the entire formation of the line between Bridgwater and Taunton (with the exception only of laying the permanent rails) were on the 26th ult. entered into on terms highly satisfactory to the company, and fully realising the anticipations of the directors, as expressed in their last report. There were nearly forty tenders, and the distance between the above towns (11 miles 35 chains) has been undertaken by responsible parties, on terms that will insure the completion of the whole in twelve months, and at a cost not exceeding £18,000 per mile. Between Bristol and Bridgwater the line is very nearly completed; the permanent rails approach now to the cutting at Pile Hill, and in a few days they will be carried to the new bridge at Templemeads.

Durham and Sunderland Railway.—On Wednesday, the half-yearly meeting of the shareholders in the Durham aud Sunderland Railway was held at Sunderland. The Directors' Report states that the revenue of the company was steadily increasing, the profit on the last six months being £995. The bill for creating additional shares was now before Parliament; and a loan of £25,000 from the London Insurance Company had been effected, upon the personal security of twelve of the directors. By a communication which would be open with the Great North of England Railway, they would be enabled to have two trains per day between Sunderland and York. The directors felt undiminished confidence in the ultimate prosperity of the undertaking, and urged upon the proprietors the necessity of acceding to the plan laid dowu by the special committee, for advancing £15 per share, in order to get it speedily out of present difficulties. The report was unanimously adopted; and after the transaction of other business, the meeting separated.

Newcastle and Carlisle Railway.—The annual meeting of the Newcastle and Carlisle Railway Company was held in Newcastle on Friday last. The progress of this company through a season of unexampled difficulty has been highly satisfactory, and it now ranks as one of the most lucrative concerns in the neighbourhood, whilst the prospect from the opening out of communications to the south and northward is upon the whole cheering. A report was submitted to the meeting, stating that the directors had completed a great portion of the works, and that but 15 miles of the line remained to be doubled. They were also making preparations for further improvement. The books showed that in nearly every description of traffic a considerable increase had taken place, such increase being upon the whole amount of traffic, independent of other sources of revenue, about five and a half per cent. The amount received for passengers exceeded that of 1839, by £2,645 18s. 9d.; for goods, by £2,085 13s. 1d.; for lime, by £96 6s. 1d.; for lead, by £765 3s. 9d.; for stone, by £561 13s. 9d.—Receipts for the week ending March 30:—Passengers and parcels, £472 11s.; goods and cattle, £1,112 0s. 2d.—Total, £1,584 11s. 2d.—*Tyne Mercury.*

Hartlepool Central Railway.—A plan and preliminary prospectus of a new railway has just been published, the object of which is to open out to those coal fields, now about to be worked in the eastern and southern parts of the county, a cheap and ready communication with Hartlepool, as well as to connect the collieries in the Auckland district by a direct railway communication with the same port. The line commences at the Bishop Auckland and Weardale Railway, near Bishop Auckland, and terminates on the Hartlepool Railway, at the $2\frac{1}{2}$ mile post from the Hartlepool Docks. The length of the lino is $18\frac{3}{4}$ miles.—*Tyne Mercury.*

Regulation of Railways.—The select committee of the House of Commons on the new Railway Regulation Bill have continued during the week their examination of witnesses with respect to the necessity of a more stringent Government control. The chief witnesses examined since our last have been Mr. George Stephenson, Mr. Bury, Mr. Baxendale, and Captain Lawes. Tho committee are not expected to make their report till after Easter.—*Railway Times.*

Railway Bills.—The Eastern Counties Railway Bill, and the London and Blackwall Commercial Railway Bill, were read a third time and passed in the House of Commons on Tuesday.

FOREIGN RAILWAYS.

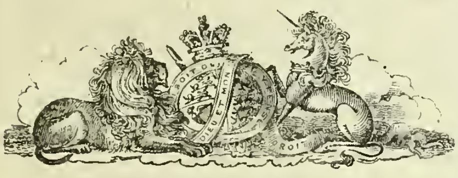
At the sitting of the Chamber of Deputies on Monday, the Minister of Public Works presented a bill for extending the term of the privilege granted to the railway company from Bordeaux to Teste. The bill was ordered to be printed.

The construction of the engines intended for the inclined plane of the railroad from Ans to the Meuse, which are constructing at Seraign, are nearly completed; but the opening of that branch of the railway will not take place until the end of the summer.

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at 7* O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 22 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes, containing the Nos. of every 6 months.



THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, APRIL 10, 1841.

A complete change in our colonial system is proposed to be effected by the Government, by extending the principles of free trade to the possessions of the mother-country. The measure which has been introduced in the House of Commons by the President of the Board of Trade will go far to give the colonies the commercial advantages of free states, by enabling them to trade directly with foreign countries, instead of being supplied with such articles through the mediation of British merchants. A differential duty of seven per cent. *ad valorem* on all foreign goods imported direct to our colonial possessions, is proposed as a substitute for the import duties of twenty and thirty per cent. at present charged on most commodities introduced directly into the colonies from foreign countries.

A measure of this kind which is so completely at variance with former colonial policy, challenges examination, and leads to the consideration of the value of colonies to the mother-country.

Hitherto it has been considered that the chief value derived from distant possessions was the exclusive markets thus obtained for the sale of our manufactures, and the supply of foreign produce. The employment of British shipping in supplying the wants of the colonies has been regarded as one of the chief sources of our naval superiority, as it was supposed that the monopoly of supplying the wants of the colonies gave a stimulus to the shipping interests, and caused the employ of a greater number of ships and sailors than could possibly be required were all foreign nations permitted to trade directly with our colonists. It was in consideration of these supposed advantages that the yearly expense of providing troops and ships of war for the defence of those distant possessions was contributed without grumbling, as a necessary and equitable payment for the advantages which the exclusive monopoly conferred. If, therefore, these imagined advantages are found, on a more enlarged view of the interests of the mother-country and of the colonies, to be illusive, and that it is to the interest of both to throw open the markets for the competition of other nations, it may then be asked, what are the remaining advantages which the possession of colonies confers, and are they worth the expenditure which their retention necessarily entails?

The manufacturing skill, industry, and capital of England enable her to compete with foreigners in most manufactures, even in their own markets; consequently a monopoly in the supply of manufactured goods is no longer of any value. Equal privileges only are wanted, so as to be enabled to compete with foreign rivals on equal terms. The extension of the principles of free trade must therefore be advantageous; for by it we obtain a wider field for commercial enterprise, without much danger of foreign competition at home.

The privilege now proposed to be conferred on our colonial possessions will, under these circumstances, be almost nugatory as regards all manufactured articles; it can only be practically operative to any extent in articles of natural produce, which they may receive direct from the producing countries in the ships of those nations. Now it is evident that to the extent of this traffic British shipping must be supplanted by the ships of the supplying nations, and if the question were to be limited to this view, the proposed measure would prove so far detrimental to the shipping interests of the country. But it must be borne in mind that one of the objects of the proposed extension of free trade is to benefit the colonies themselves; and by increasing their trade to add to their wealth and prosperity. By this means they will become more extensive purchasers; and as the interest of a manufacturing nation must be promoted by adding to the wealth of the people whom it supplies, the operation of this liberal mode of treatment must eventually tend to extend our commercial dealings with the colonies by extending their means of purchasing, and to place the trade on the more substantial basis of independent mutual interest, instead of resting, as at present, on compulsory prohibitive regulations.

The apprehended injury to our commercial shipping by the extended foreign competition will, we feel persuaded, prove to be an imaginary evil. We anticipate, on the contrary, that the improved colonial system of commerce will eventually extend our trade with the colonies, and be the means of strengthening the power of Great Britain.

One of the necessary consequences of foregoing the privilege of exclusively supplying our colonial possessions, must be the reciprocal advantage, to the mother-country, of being made equally free to purchase the produce of which the colonies now possess the monopoly in our markets. West Indian sugar and Canadian timber will have to enter into competition with the sugar of Brazil and the timber from the Baltic, and this country will thus be fairly relieved from an onerous and injurious restriction, which now narrows the comforts of the people, and is seriously prejudicial to manufacturing industry.

But if we grant the privilege of free trade to our distant possessions, and forego the privilege of monopolising their markets, the question arises of what use are colonies to the mother-country?

It must be admitted, that in a commercial and manufacturing point of view, the utility of colonies diminishes in proportion to the improvement in the manufactures of the parent state. There is then less necessity for establishing monopolies, because the articles offered for sale defy competition; and if the friendly dispositions and liberal policy of foreign nations could be relied on, colonies would in such circumstances become worthless appendages, in a commercial point of view. It is because the narrow feelings and passions of mankind urge the different governments to adopt protecting and prohibiting tariffs in their transactions with other nations, and not unfrequently to stop all communication between them, that it becomes advisable to extend the sphere of influence in which these feelings and passions cannot operate to our prejudice. We are thus assured of an extended market for our goods when all other ports are closed against us; and, in case of war, the colonies and the mother-country of a powerful maritime nation, can mutually supply each other's wants. In this view, extended colonial possessions must always prove advantageous to the manufacturing industry of a nation, independently of their political importance.

When a colony is sufficiently powerful to defend itself against foreign aggression, it is good policy, politically as well as commercially, to assist in establishing its independence. The *prestige* of former friendly connection will serve as a guarantee for the maintenance of peace and commercial relations; and when those can be secured, the advantages of colonies may be enjoyed without the expense attending their maintenance.

NEW INVENTIONS.

IMPROVEMENTS IN FELTED CLOTH MANUFACTURE.

Mr. Hirst, manufacturer of Leeds, has taken out three patents for the manufacture of felted cloth, the description of one of which was given among the specifications in our last number, and one of which is not yet specified. Mr. Hirst's first patent for this mode of manufacturing cloth was taken out several years ago, though the use of felted cloth has been only recently brought into much use. All Mr. Hirst's operations for felting and finishing are performed by hand-labor only; for though steam or water power may be used, there is no advantage gained, either in cheapness or superiority of workmanship, by employing other than hand-labor. The process is now brought to such perfection, that it is stated Mr. Hirst can manufacture and finish cloths at from twopence to sixpence per yard, the strength of which is as great breadthways as lengthways; and he can make them either as thin as the finest cloth, or an inch thick if required. The thinnest cloths also may be made of different colors on the two sides. The machinery is simple, and is, as he states, of small cost compared with others contrived for the same purpose. It is estimated that it will not cost more than one-seventh the expense of getting up required by other machinery invented for the same purpose. It is expected that the whole of Mr. Hirst's machinery will be in useful operation in about a month from the present time.

IMPROVED PLAN OF CHISELING MARBLE OR FREE STONE.

A method of cutting letters in marble or free stone has been invented by Mr. Page, an American staturay, now in this country, which prevents the edges of the stone from chipping. This is effected by coating the surface with cement, which adheres to the stone or marble, and the chisel can then cut through as sharply and evenly as into a metal plate. When the letters are cut, they may be blackened by smearing the whole surface with the black varnish. The cement is then readily scraped off, and the engraving is left without blemish, the edges of the stone being perfectly sharp and free from the chipping which the usual method of chiseling produces.

FLAT IRON WIRE ROPES.

Round iron wire ropes have for upwards of two years been successfully used in the collieries on the Continent. Another improvement in these ropes has been made which will render them still more useful. M. Louis Goens, manufacturer at Termonde, in Belgium, has obtained a patent for *flat* iron wire ropes. This cordage, which resembles in a great degree flat hempen ropes, possesses extraordinary strength. When properly applied it will last twice or three times as long as the ropes in present use, and yet the new rope costs a fifth less. Independently of these advantages the flat iron wire cord is more flexible, less bulky, and a great deal lighter than the ropes now used. The latter fact deserves the serious attention of mine proprietors especially, for a great quantity of power is now unprofitably employed in deep shafts in bringing up the weight of the rope alone. The first of these flat iron ropes manufactured by M. Goens, were applied by Messrs. Picard, Davignon, and Co., proprietors of the coal mine of La Bonne Fortune, near Ans, where they are now working, and give great satisfaction. Those gentlemen were the first mine proprietors who employed the round iron wire ropes.

MELVILLE SAFETY-LAMP.

This lamp is intended as a signal for distinguishing steam-vessels from sailing-vessels at sea. Mr. Melville's plan is to place in front of the funnel of the steamer a lamp, with a clear light, and a strong reflector having an external sliding cover attached to its face, so fitted as completely to obscure the light within, but to be made to move up and down the whole length of the lantern by means of a rod affixed to a small lever power connected with the engine, so that the motion or alternations of the slider would be at the rate of twenty in a minute. At the bottom is to be added a flat sole, made so as to carry the rays of light completely over the side of the vessel, in order that the reflection from any object on deck may not interfere with the sight of the pilot. By means of this simple apparatus, a signal will be produced perfectly distinct from any other known in navigation, and by means of it a steamer will, at first sight, be known from any other vessel. The working of this new invention has been seen by experienced and intelligent steamboat captains, besides many scientific gentlemen, all of whom expressed themselves highly gratified with the experiment, and fully convinced of its success.—*Glasgow Argus.*

A NEW LIFE-BOAT.

Mr. Andrew Hennessy of Cork, a very successful ship-builder, has invented a life-boat, which not only combines all the improvements heretofore known, but possesses original claims peculiarly its own. The following is the description of the boat:—"The safety-boat can be formed of any size, from the sculler on the Thames, to the launch of a first-rate man-of-war; this at present to be alluded to is 33 feet to a straight rabbet, $6\frac{1}{2}$ feet beam, and $5\frac{1}{2}$ feet deep, capable of conveying sixty-six passengers with a crew of six, with every other requisite for future preservation after quitting the vessel. The boat in all its parts is perfectly elastic, except about three-fourths of its keel, which is secured by three bars or plates of copper or iron—one plate on each side of the keel, and one on the flat at bottom. These plates are of sufficient substance to give strength and stability, and help to act as a preponderating medium against the danger of upsetting, together with the precautions that are taken in the interior, so that it can never upset by accident; but if compelled to it by way of experiment, it will right itself in an instant without injury to crew or passengers, or admitting one drop of water. The stem and other parts of the keel are secured by thinner plates in joints neatly fitted one within the other, so as to give strength to these parts, still preserving their elasticity, that being the grand principle upon which the whole structure depends. The timbers, which are very slight, are of oak, tarred and parcelled with light strong canvas, with a casing over that of thin whalebone taken out of a stove or boiling-pan, then served like a rope with a spun yarn, and the outside finished with leather or improved canvas sewed on; by being secured in this manner they become of great strength, and are perfectly elastic; and though bent any way they never lose their form, a most essential property, as they are removed at pleasure when the boat is stowed away. The covering or skin, in place of plank, is a kind of cloth—the result of long and arduous application, his sole invention. It is of great strength and durability, and perfectly waterproof; for additional strength and security, there are two skins of this fabric, graduating in thickness from the outside inwards, so as to prevent any possibility not only of water but any damp coming through. The materials of this cloth are saturated with a chemical process in the loom, which preserves it from wet and the action of the atmosphere; it always preserves its pliability, and will not heat, mildew, or rot. As a proof of the perfection which this manufacture is brought to, the inventor has converted some of the thinner kind into the upper part of shoes, which is much cheaper than leather, and far more durable. The boat has two pair of gunwales, secured the same as the timbers, all the heads of which are received and steadied by the first pair, and the other pair lashes and fastens to the first, which keeps the timbers in place, and perfectly secure. The covering, or skin, is secured to the keel, and brought to the gunwales, the same as a sail laces to a yard; so that, at first view, it comes within the comprehension of a seaman, to put it into form or take it asunder. It is decked, or covered, with the same cloth or skin: the deck laces through the centre, fore and aft, from stem to stern-post; in this joining there are laps or doublings, which effectually exclude any water from getting in. There is a hollow tube comes through the deck, which answers for a mast-step, and gives air to the persons in the interior of the boat. The oarsmen sit on their thwarts, which are of cloth through the deck, from which coats are erected the same as the coat of a mast or pump, which are neatly fitted by plates to their bodies, and buckle below their breasts. From the construction of the safety-boat it becomes portable; the gunwales and deck-support slip up; of the stem and post, the timber ceiling, &c., all come out, and the skin folds together or rolls up the keel, so that it occupies but little space, and can be put together in a few minutes when wanted. There is no danger or casualty that the present boat, or lifeboat, is liable to, but is guarded against in this, and every certainty of saving life from the vessel lost in the ocean, as well as the vessel lost on the rock or the shore."

SCIENTIFIC CORRESPONDENCE.

SOUNDING BY ELECTRO-MAGNETISM.

To the Editor of the "Inventors' Advocate."

Sir,—I am greatly obliged to you for the favorable notice taken of my Electro-Magnetic Sounding Machine, in the last week's number of the *Inventors' Advocate;* and I have the pleasure this week of informing you that I have discovered, that by using part of Mr. Massey's valuable sounding apparatus, in connection with it, I can make it indicate on a dial, in any part of the ship (as soon as the lead enters the water), every inch the lead descends until it rests on the bottom, when it will ring the bell as usual.

By giving this a place in the next week's number of your highly useful and widely circulated journal you will still further oblige,

Your obedient servant,
Alexander Bain.

35, Wigmore-street, Cavendish-square.
April 6, 1841.

CLAIMS TO THE INVENTION OF THE ELECTRO-MAGNETIC CLOCK.

To the Editor of the "Inventors' Advocate."

Sir,—The statement of Alexander Bain, in your number of March 27th, does not invalidate the claim of Professor Wheatstone as inventor of the Electro-Magnetic Clock. Professor Wheatstone gave me instructions to make his electro-magnetic telegraphic clock on January 6, 1840, which was more than six months before Mr. Bain says he made his communication.

Your obedient servant,
John Lamb.

Cook's Buildings, Old Kent-road, April 7, 1841.

SUBSTITUTE FOR FLY-WHEELS IN STEAM-BOATS.

To the Editor of the "Inventors' Advocate."

Sir,—Your remarks upon the letter of a Subscriber in your last number are perfectly correct as far as they go; viz., the momentum of the boat when under way is a substitute for a fly-wheel to the engine, and the placing the cranks at right angles are, as you say, the principal means of compensation, because, when the crank of one engine is at the dead point, or top and bottom of the stroke, the crank of the other engine is at the point where they have the greatest power. But how do you account for the action of an engine where there is but one in the vessel; the cranks cannot then be placed at right angles? and I have seen such an engine in action, when the vessel was moored at the quay or wharf side; hence the momentum of the vessel was lost, and yet I have observed some of that kind of marine engines work well.

I have likewise seen cast-iron paddle floats fixed at right angles to the dead points of the cylinder, but although they would have a tendency to propel the crank over the centre at one point, they would have an equal tendency to retard it at its opposite point; hence the only advantage gained from such a construction, is owing to its combining the principles of a fly-wheel from the great weight of the floats placed in motion at the extremity of the arms of the paddle wheels.

I am, Sir, your obedient servant,
J. H. S. C.

[We apprehend that in steam-vessels worked by one engine a difficulty must always arise in starting when the piston happens to be at the top or bottom of the cylinder; that is when the crank is at the dead points. What we contend for is, that the momentum of the ship when in motion, serves the purpose of the fly-wheel, and that the revolving paddle-wheels do not serve as a reservoir for the power.]

IMPROVEMENTS IN RAILWAYS, AND THE WHEELS OF LOCOMOTIVE ENGINES AND CARRIAGES.

To the Editor of the "Inventors' Advocate."

Sir,—In trespassing on the pages of your ably conducted journal, I being a mechanic, more accustomed to wield a *hammer* and *chisel* than the pen, would humbly beg your's and the public's indulgence for all grammatical errors, and faulty style of writing. I have been induced to address

myself to you in the hopes of claiming the honor, though I may not reap the benefit, of some new improvements in railway machinery, which I conceive to be worthy of notice.

'Tis now six years since some, and eight to ten years since others of the inventions, a description of which I remit you, have been in my possession, and though only part has been in full operation, yet the rest I have so matured in my own mind, as to be perfectly satisfied of their efficacy in suiting their intended purposes. Had I been a manufacturer of steam-engines, or otherwise placed in a position to enable me to bring those improvements practically to work, the public might have been in possession of them years ago, but such not having been the case, and there being no likelihood of my ever being able to bring them forward, I now send them to you for publicity.

According to my humble opinion, had all curved lines been dispensed with on railways, unless where absolutely necessary to pass from one line of country to another, many millions would have been saved, and the wear and tear of the machinery reduced to 25 per cent. However, as the railways are now made, and as it is not here exactly the place to discuss those matters, I leave them in the hands of their talented constructors, and pass on to the examination of those improvements fitted to work most economically on the lines now in existence.

In the first place.—The leading and trailing wheels of locomotive engines, either with four or six wheels, would work better were each wheel to be keyed upon a separate shaft so as to revolve independently. This may easily be done in the following manner:—Let the wheels be keyed upon their respective shafts in the usual way, with either outside or inside bearings, whichever may be the most convenient, and let the shafts have middle bearings to meet in the regulating line common to all. If the wheels and axles are made in this way, the wheels on the outside rail would revolve quicker than those on the inside, and would allow the engine to find its own bearings. This would be particularly evident in going round curves, and would be the means of preventing many accidents from engines being very liable to be thrown off the rails on those parts according to the present system.

In the second place.—It is proposed that each of the leading and trailing wheels shall be keyed upon a hollow shaft, in the usual way; these shafts to have no external bearings, but to be bushed with brass bored to fit the solid shaft, or spindles which will be required to work into them. The solid shafts to have a bearing at each end, and one in the middle if required. This plan will allow the outside and inside wheels to revolve independently on the curves or otherwise, and will also prevent them wearing irregularly. Should any obstacle be thrown in the way of the engine, the wheels revolving separately would prevent it from coming off the rails, as the wheels would act as a check to each other, or as a complete check or guard rail on any part of the line as hereafter explained.

Thirdly.—The wheels to be made of either wrought or cast iron, (the latter would be preferable), and to have a flange on each side by which they would not be required so strong as those now in use, because they would take the lateral concussions, or side jolts, more equally than the present kind. Should the engine be thrown to one side, both wheels would take an equal share of the strain or jolt, whereas in the present system the wheels on one side take the whole strain. This properly adjusted, the conical wheels may be dispensed with, as well as the check or guide rails upon the whole line, which latter is a great nuisance. In the plan thus proposed the rails would be laid level, or horizontally across, and not at an angle as at present, and they would have to be the segment of a circle upon the face; in place of being conical. Each wheel would thus act as a check rail for the other during the whole of the journey. Should the rails be out of gauge so as to cause the wheels on one side of the engine to mount upon their flanges, and throw the train off the rails, as is very often the case with the present system, the double flanges would obviate this evil, and keep the engine in its proper course, until the wheels again found their places. The switches will remain without alteration, but the points may be altogether dispensed with. By this method of working there would be a great saving in the wear and tear of the engine and rails, it would reduce the cost of keeping the engines and road in repair, and lessen the friction, as well as the quantity of fuel, with all other expenses in like proportion.

In constructing the permanent way much time might be saved, as no attention will be required in laying the rails to an angle, as they would now be horizontal were the road itself straight. Giving to the outside rails the proper rise in the curves, the angle of the two rails would incline both one way, and not reverse to each other as at present. This would afford the engine another mechanical advantage on the curves, giving gravity a much greater opportunity of acting against the momentum of the machine. The engine would thus be kept in its proper course in the curves much more forcibly than is afforded by the present method of laying railroads, as the angles of the two rails are acting against each other, the outsides of both being higher than the insides, and causing a great friction upon the axles, brasses, wheels, and rails. This the proposed alteration would entirely obviate.

All the conical wheels now in use, through concussions and constant rolling upon the rails, squeeze out on one side. No conical wheels retain their proper form much longer than two months if daily at work. Each wheel causes the flange of the opposite wheel to act with great force on the inside of the rail, and *vice versa*. The large hollow fillet that is left in the angle of the flanges of the wheels crushes down the inside angle or corner of the rails. This the proposed wheels would obviate. The weight of the vehicle would be also much better distributed over the surface of the rails. This alone is a great inducement for the introduction of double flanged wheels in loose axles, as the rails would last double the length of time.

In the fourth place.—As the wheels seldom squeeze out on the side next the flange, and the wheels being all made from cast-iron, there would be no spreading if double flanges were used. The longitudinal shake, or clearance, that is generally given to the axles in their brasses, would not be required, as the action of each being entirely in itself, and enclosed in brass, will retain the oil much longer, and not require that attention which the present do. Were the engines and carriages made according to this arrangement, the loss of power in the curves would not exceed from eight to ten per cent. above that on a straight line, always, of course, depending on the radius of the curves.

In the fifth place.—The whole of the engine and tender wheels should be furnished with double flanges, the latter to be of different diameters; causing thus different depths from the face of the wheel to the tops of those flanges. The reason of this will be easily explained.

Railways at present are nothing but a series of complication of curves, all differing in intensity. To carry engines round those continually changing curves without trailing and great friction, would require wheels of greater and less diameters; and this difficulty I propose to surmount by means of those flanges, which will become *bona fide* for the time the wheels of the machine. To enable to make use of the above arrangements, I propose to have radiated plates, or segments, put down on each side of the main rail, at such a depth from the face of the rail, as to cause the wheels to be lifted from the rail, and allow the flanges to act on those segments; the machine rolling at one time on the large flange, at another on the small, and from hence on the face of the wheel; those alternations, of course, depending on the nature and radius of the curve. The length and position of those segments would be found by a calculation depending on the intensity of the curves.

Were engines, carriages, &c., &c., provided with such wheels, and the railways with segments to suit, it would be next to impossible for the train to leave the line of road. For, even supposing the whole of the tires on one side were to come off, the train would be kept in its course by the double flanges of the wheels on the opposite side. At present if a single tire comes off, the engine is precipitated from the rails, and, if without any more serious results, the train is detained till the arrival of another engine, train, or other means of locomotion.

I may in addition mention, that the fatal accidents arising from furious driving, which is more or less practised on all lines, would be altogether prevented. For not even the velocity of one hundred miles per hour could force the engines or carriages off the rails, so firmly would the wheels be bound to the rails, and so sweetly would they glide round the curves if made on the above construction.

With many apologies for intruding my ideas on your notice, I am, Mr. Editor,

Your obedient servant,

WM. ANDREWS.

Great Western Railway, March 26.

P. S.—Were the wheels and segments properly calculated for each other, the parting or cutting of the shafts could be dispensed with, and they might remain just as they are at present.

If, to the contrary, the above method should be rigidly attended to, if the railway machinery is desired to work free from friction.

W. A.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING APRIL 12, 1841.

Tuesday	Medico-Chirurgical Society	8	P.M.
	Zoological Society	8½	P.M.
	Royal Botanic Society	8	P.M.
Wednesday	Society of Arts (Illustration)	7½	P.M.
	Graphic Society	8	P.M.
Friday	Botanical Society	8	P.M.
Saturday	Asiatic Society	2	P.M.
	Westminster Medical Society	8	P.M.
	Mathematical Society	8	P.M.

ROYAL INSTITUTION.

April 2. Friday Evening Meeting.

Mr. E. W. Brayley, jun., delivered a lecture on the "Geology of the Moon," a subject we must admit of too speculative a nature to merit much of our attention; for even Mr. Brayley himself after he had been talking for upwards of an hour could not adduce in substantiation one single inference (and *legitimate* ones too as he considered them) which could tend to support the assertions he had made during the hour's conversation. He was inclined throughout to consider the subject one of science and research, although it had not met with the support it was worthy of among philosophers in this country. It was affirmed that the moon is possessed of physical features analogous to our planet in every respect, with the exception of its being destitute of an atmosphere. We are indeed aware, that Mr. Brayley had nothing *new* to communicate; the assertions (we cannot call them facts, as they are too far distant to be considered such even when gazed upon with instruments of the greatest power) were those recorded in the several volumes he had upon the table, more especially of Beer and Madler of Berlin, who published the finest representation of the moon's surface, depicted on an elaborate map, portions of which he had enlarged, forming the illustrations to the discourse. Judging from what these authors, and probably others, affirm, Mr. Bray-

ley even went so far as to state, that the configuration and physical character of the moon's surface was much better known than many parts of our own globe. Galileo, the inventor of the telescope, was about the first to recognise the distinction between the valleys and mountains of the moon; and he has described this with other of the planets in his work as "other earths." The sagacity and ingenuity of Thomas Hook led him to conclude that the various apparent inequalities of the moon's surface were due to the existence of volcanoes. Another author (Hevell?) published a work on the physical configuration of the moon's surface, illustrated with maps, in which he gives the several spots' names, derived from some of the principal philosophers of the earth, such as Newton, Euclid, &c., these, as may be imagined, were quite of an arbitrary character. Successive authors of some celebrity were enumerated as having treated of the physical geography of the moon, in the last century, including the names of Schrader, who was the first to state the height of the hills and the depth of the valleys, which have since been proved (or rather stated) to have been much too high. Russell was the first who constructed globes of the moon; and other improvements were suggested by Drs. Brewster, Kitchener, Herschel, &c.

Having thus given a brief outline of the history of the "science," Mr. B. proceeded to consider the moon as an object of astronomical research, and in doing this (as he confessed himself no astronomer), he stated that he doubtless would violate much, the laws and principles of astronomical research—in the act of giving his account of its geology. The distance of the moon from the earth is estimated at 237,000 miles—its bulk or solidity compared to that of the earth about one forty-ninth—its diameter 2,160 miles—and its computed density about six-tenths of that of our planet. Brilliant spots were observed on the moon's surface by Herschel in 1783 and 1787, and by Capt. Kater in 1821. In 1826, the Rev. Mr. Emmett gave the results of his observations to the world. He observed nearly in the centre one or more small circular spots, which, at first, did not exhibit any remarkable phenomenon. After a short time he noticed a smoky nebulous appearance elongating in one direction, as if influenced by currents of wind. It became fainter and fainter, and ultimately disappeared, leaving a small roundish spot resembling a bird's-eye view of the crater of a volcano. The fact just quoted was stated by Mr. Emmett to be doubtless a volcano in an active state of eruption. But then again, as Mr. B. observed, other philosophers did not view it in the same light, fully confirming in our minds the very sceptical state of the pretended science of the geology of a planet two hundred and thirty-seven thousand miles from the earth's surface.

The principal object the lecturer had in view was to point out the analogy existing between the configuration of several parts of the earth's surface (such as a bird's eye view of some parts of Auvergne, as depicted on a map), and that exhibited by the enlarged views of Beer and Madler's map of the moon, which served for his diagrams. As far as the drawings of the two were concerned and the description given by the lecturer, it would appear to those more than ordinarily interested in the subject, that an approximation of a more or less close character was to be found in each of the representations. Allusion was made to several of the principal mountains of the moon, pointing out the measurements given by those who have investigated the subject; the depth of the crater of one of which measured *one mile and an eighth*, and its height was compared only to the highest mountains in the North of Europe.

We have entered upon this subject to a greater extent than we at first intended. We are still sceptical on the subject, especially when we reflect on the "*legitimate inferences*" adduced as to eruptions, &c., occurring without the presence of an atmosphere. As soon as the principal inferences had been stated, as above quoted, we closed our notebook, feeling assured that our readers like the audience require something of a more tangible character to occupy their attention. Although Mr. Bayley, as usual, gave every satisfaction as regards his elocutional powers, we do not consider the subject of sufficient importance, or based on sufficient data, to occupy the attention of those who visit this institution; judging at least from the absence on this occasion of the great movers and influential individuals, who make a point of being present at the elucidation of points of true science, even though popularly treated.

BOTANICAL SOCIETY OF LONDON.

April 2. *J. Twining, Esq., in the Chair.*

A paper was read by Dr. Lhotsky, "On the Genus Eucalyptus, and its connection with the Vegetation and the Physical Features of New Holland." It has often occurred to the author whilst wandering for days and days amongst the mountainous forests of *Eucalyptus*, that if any one were to look down from a proportionate altitude upon the continent of New Holland, nothing but the pale hue of the foliage of this genus would present itself to his sight. But it is not only by the preponderant number of individuals and the mass of vegetation, that the *Eucalyptus* characterises the Flora of New Holland; it is by the nature of its foliage, and still more by the structure of its ligneous fibre, that it exercises a vast influence upon the vegetation, and the other grand features of the country. By the decomposition of these trees but little matter is left behind, a fact well known to the colonists (although many of the Eucalypti measure ten feet at their base). The fibre is short, brittle, and full of a resinous matter. Tannin, one of the chief ingredients in *humus*, or decomposed vegetable matter, is here in a very trifling proportion. Dr. L. attributes the open character of the Australian forests (generally compared to our parts) to the non-production of vegetable humus by the decomposition of these plants, and therefore not supplying nourishment in sufficient quantity to allow of the growth of underwood, &c.

There is one phenomenon which characterises Australian forests, and in the cause of which the *Eucalypti* are also concerned. Forests in this country are destitute of shade, and the little rain that falls during the summer is almost instantly evaporated; and this defect of shade co-operates greatly with the above cause to impart a degree of sterility and barrenness to these spots.

Dr. Lhotsky dilated on the influence which the *Eucalyptus* exercises on the character of the chief inhabitants of the country, both of men and quadrupeds. He proceeds to show that the structure of the wood, being, as before-mentioned, of a short and brittle resinous fibre, is exceedingly well fitted for easy and speedy decay, especially of the interior of the trees, which even extends to the very branches: this is at once evident by setting fire to the trees at their base, when, in a very short time, the flames will become evident in many of the larger branches. It is in the hollow stems of these *Eucalypti* that the wild animals conceal themselves during the heat of the day, and search for food only at night; so that the traveller may journey for hours in the Australian forests, and not observe a single quadruped. The kangaroo appears, according to the observations of Dr. L., to be the only quadruped which does not inhabit the trunks of trees during the day time. It is by firing these trees that the natives procure the greater part of their food, and which they thus effect. When the fire is lighted at the root some of them ascend, and lay wait at some of the holes in the thicker branches. But when the smoke which soon pervades the loose texture of the decayed part, causes the *Hapolethes*, *Opossum*, and others to pursue their course upwards, they are captured by the weary huntsmen.

ROYAL ASIATIC SOCIETY.

The ordinary meeting of the above society took place on Saturday last, Professor Wilson in the Chair. Sir G. Staunton said that he had received a letter from the executors of the late Thos. Manning, Esq., stating that that gentleman had bequeathed to the society the whole of his valuable collection of Chinese books. As Mr. Manning had been for many years a resident in China, and had made considerable proficiency in the language of the country, his library was composed of the choicest and most valuable specimens of the literary productions of that interesting people. It was a most important acquisition to the library of the society, and he (Sir G. Staunton) moved "that the special thanks of the society be communicated to the executors of the late Thos. Manning, Esq., for the donation, and that the collection be deposited apart from the others, and entitled 'the Manning collection.'" Mr. Ball seconded the resolution, which was carried unanimously. Mr. Stevens read a paper regarding the modern deities worshipped by the Hindoos, after which the society adjourned.

LINNÆAN SOCIETY.

April 6. *Edward Forster, Esq., F.R.S., &c., V.P., in the Chair.*

Dr. Cook and Mr. Stevenson were admitted fellows. Mr. Cameron of the Birmingham Botanic Garden forwarded for exhibition a variety of interesting plants in flower. An extract of a letter from Mr. J. Burnham was read, "On an undescribed species of Juncus (Rush)." The author has found it rather abundantly about villages and country towns in Shropshire and Herefordshire, and not finding it described either in Decandolle's Prodromus, or in the 4th edition of Hooker's British Flora, he furnished a description of it under the name of *Juncus lucens*. It is chiefly distinguished from the common rush (*J. effusus*), by its thick and light colored scapes. Ray, in his synopsis, probably alludes to it, although he does not sufficiently describe or characterise it. It is applicable to all the purposes to which the common kind is applied.

A paper was read from some foreign correspondents, addressed to Professor Don, "On the alteration which the atmosphere undergoes during the elevation of the temperature of the air within the Spatha of Collocasia Odora." The experimeuts having been performed several times with the same results, the authors considered them of sufficient importance to be made known. The apparatus used was that previously described by experimenters, with this exception, that the receiver was placed in mercury instead of water. The whole of the plant, with the exception of the *spadix*, was varnished and otherwise interrupted from performing a part, or interfering in the experiments. The degree of warmth produced was, in the first experiments, determined in the ordinary way, that is, by means of a mercurial thermometer. After giving a lengthy series of tables illustrating their observations, morning, noon, and afteruoon, the authors conclude by stating that, after their experiments oxygen gas was not found in the receiver, but carbonic acid gas occupied its place; that oxygen gas is necessary for the production of warmth in vegetables. When the plant was immersed for some time in nitrogen no heat whatever was giveu off. They ascertained very minute degrees of heat by means of the thermo-electrical apparatus, which has been so successfully employed lately in France for this purpose. Neither did the light or the dark in any way influence the experiments.

A communication was also read from Mr. Bracy Clark, being "An appendix or supplement to a treatise on *Œstri* and *Cuterebræ* of various animals."

INSTITUTION OF CIVIL ENGINEERS.

April 6. *Mr. Walker, the President, in the Chair.*

On Tuesday evening, at the usual weekly meeting of the Institutiou of Civil Engineers, among other papers, there was read an abstract of a paper by Dr. Schafatul, which the author, who was present,

illustrated by a small apparatus he had with him, to show that the bottom of the boiler was blown away before the top, in case of an explosion, or rather that the explosive force reached the lower part before the upper, and that therefore "the present safety valve was in many cases little better than useless." Mr. Josiah Parkes made many remarks on the doctor's experiments, and generally on the causes of the bursti·g or explosion of boilers. He gave several extra·rdinary instances of the different effects of explosions, and argued that there must be different causes to produce those various effects. In some cases the accident resulted from there being no water, or only very little, in the boiler; in others because there was too much; in some because the existing safety valve was closed; in others because it was suddenly opened; and in some cases because there was neither water nor steam in the boiler, nor fire below it. He gave examples, and where the consequences had too often been the sacrifice of lives to a very great extent, as well as the destruction of property. After adverting to the accident on the Norwich river in 1817, which he observed appeared to be one of those events that formed part of the "stock in trade" of every writer on steam-boiler explosions, he adverted to one at Stockport, which occurred when there was neither fire, water, nor steam present. In that instance, the stoker had, on the Saturday evening, emptied the boiler of its water by knocking up a plug in the bottom, and thereby extinguishing the fire at the same time. The stoker then left the place without having taken off the plate from the top of the man hole. On the Sunday afternoon, about 5 o'clock, the unfortunate man went to clean out the boiler. He took the cover from the man hole, placed a lantern he had on the top of the boiler, and descended into it by means of the iron ladder. When he was nearly down, he took the light, and brought it into the boiler, and that instant he was sent up about 100 yards into the air, and fell through the roof of the dye-house. The boiler rose many feet, and fell back into its seat. The man was scorched as black as a negro. The engineer who entered the yard about the time to see that the stoker was at his work, heard him in the dye-house exclaiming, "Let me out; let me out. I am *frozen* to death!" He broke open the door, and the poor fellow ran past him into his own house on the premises, and died that night, after minutely detailing how the accident had occurred. Then (inquired Mr. Parkes), what was the cause of the explosion? It could not have been in the boiler, for if it were the force would have acted on all sides of it equally. Then where was it? He continued, that for many years he had diligently collected the facts attending every explosion he heard of, and was preparing to put them in such a form as to afford facilities for examination; but in the meantime he thought it advisable to direct the attention of practical men to the facts, that they might arrive at the causes of those explosions, and the manner in which the force acted. He afterwards spoke of an immense number of explosions, adding, that in iron works it was known that a single drop of water would produce tremendous explosive power in this manner: if in a puddle-furnace a drop of water were placed on the red hot slag no effect is produced, but if the drop be pressed into the metal with a stick, then it explodes with force sufficient, not only to shatter the furnace, but to blow away the roof of the building. The drop of water could not produce steam sufficient to fill the furnace, so that Mr. Parkes supposed the instantaneous generation of steam from even that small quantity of water produced a wave in the air, which was projected with such force as to destroy everything before it.—*Times*.

SCIENTIFIC MEMORANDA AND NOTES ON ART.

United Service Institution.—On Tuesday evening the second meeting (for the season) of the members took place, Captain Vernon in the chair. Mr. Adams read a paper on the structure of the pneumatic railway and of the disc steam-engine. The lecturer was warmly applauded. Mr. Coles exhibited a model of a railway carriage of his own construction, and contended for its superiority over the carriages at present in use. A splendid microscope, constructed by Mr. Pritchard, was also exhibited. Several presents from Lady Troubridge, Major Napier, Lady Ommanney, and Hamilton Hamilton, Esq., were announced and shown to the meeting. Amongst the presents were dried plants from Van Diemen's Land and the Alps, military plans, panoramic views, Roman antiquities, &c. A plank taken out of the bottom of the ship Underwood, which the lightning had gone through, and a bag made use of by the natives of St. Kanara, India, and which had been formed from the bark of a tree called lessura excelsa, attracted special attention. On Tuesday afternoon Robert Adams, Esq., delivered a lecture on voltaic electricity, including the electrotype.

Royal Dublin Society.—The Lord Lieutenant has appointed a commission to consider in what manner the £5,300, hitherto voted for the Royal Dublin Society, can be best applied "for the promotion of science and the useful arts in Ireland." With one exception, the commissioners are men of science, and all of them are eminently qualified for the duty which they have undertaken. The Dublin Society, having refused to alter its constitution as requested by the government, the grant has been denied. One of the principal points insisted on by the government, was, that the news room, belonging to the society, should be discontinued, and that the society should confine itself purely to scientific and literary objects.

New Operation for Aneurism.—An operation in a very serious and almost hopeless case of aneurism was lately successfully performed by Mr. Skey, of St. Bartholomew's Hospital, in the presence of Sir Benjamin Brodie and other eminent surgeons. The gentleman who was the subject of the operation is the Rev. D. Pretyman, Rector of Middleton, in Oxfordshire; and the aneurism to be removed (which may be popularly described as the formation of a dangerous *sac* upon a blood-vessel) was situated on the sub-clavian artery, a fearful locality. Ordinarily, an operation of this nature occupies from thirty minutes to an hour, the result being in the majority of cases fatal, in consequence of great loss of blood and total prostration of animal vigor. In the present instance the operation was performed in ten minutes, and the loss of blood only two ounces, circumstances which are due to an entirely novel method of performing it. Mr. Skey conducted the operation by first making an incision in the neck downwards, above the clavicle, the muscular fibre being afterwards gradually divided *(slit)* by a silver knife, until the seat of the disease was reached, and the aneurism removed. This mode of performing the operation is to be looked upon as a great step in surgery, the ordinary method of making the incision in the lower part of the neck, and dividing the carotid veins and artery, exposing the patient to the serious evils previously mentioned. So unexpected was the recovery of the Rev. Mr. Pretyman, that on his arrival at the rectory the bells were set ringing, and the parishioners made general holiday.

Guyon on Living Worms under the Conjunctiva.—Blot of Martinique, has, like Bajon of Cayenne, and Mongin of St. Domingo, seen two worms in active motion under the conjunctiva, which he removed by incision. One of these, which was sent to M. Blainville, was thread-shaped, thirty-eight millimetres long, with a black protuberance adapted for suction.—*Dublin Journal, &c.*

REGNAULT, in his researches on the specific heats of compound bodies, either liquid or solid, arrives at the following conclusions:—1. In metallic oxides of the same chemical formulæ, their specific heats are in inverse proportion to their atomic weights. 2. In the sulphates composed of one atom of sulphur, their specific heats are in inverse proportion to their atomic weights. 3. In compound bodies, having the same electro-negative elements and a like atomic constitution, the specific heats are in inverse proportion to their atomic weights. 4. In all compound bodies of the same atomic composition and chemical constitution, their specific heats are in inverse proportion to their atomic weights.—*Comptes Rendus, Jan.* 11, 1841.

The late Francis Bauer, Esq.—Mr. Bauer continued, up to a late period, his microscopic researches and drawings; but unwilling to risk the chance of leaving any work unfinished, he at last determined to rest, and to attempt no more. Seated near his microscope, which long use had made almost essential to his happiness, he spent his hours in re-examining what his pencil had so admirably perpetuated, and reviewed, in the monuments of his labor, the history of his life. Mr. Bauer was born a Feldsberg, in Austria, on the 4th of October, 1758, and died at Kew on the 11th of December, 1840.—*Athenæum.*

On Mounting Opaque Objects for the Microscope.—The plan usually adopted of mounting opaque objects on dead black paper, is objectionable on account of the small fibres on the surface of the paper reflecting some considerable portion of light. The plan adopted in mounting minute objects to be viewed, either opaque or transparent, is simply by placing them on a piece of crown glass with a little weak gum-water, and surrounding them to the extent of a quarter of an inch or more with a rim of card-board sufficiently thick to prevent the object being removed or broken, when another slide is placed intentionally or otherwise upon it. By using the *stop* the object is made opaque, and an even and uniform dark-coloured field is by this means obtained. —*Microscopic Journal.*

Measuring Telescopes.—Mr. E. Bowman, of Newcastle-on-Tyne, has, we understand, after many years of experiments, succeeded in rendering telescopes (such as those upon the best levels,) applicable to measuring distances, with a degree of accuracy equal to the chain.

Magnetic Telegraph on the German Railways.—The experiment of an electro-magnetic telegraph is to be made by the side of the railroad between Berlin and Potsdam.

Diamond Polishing.—Bruges was the birthplace of Berken, who discovered the art of polishing the diamond; and, as if the secret were still confined to the craft (in fact it was for a length of time a secret amongst the jewellers of the Low Countries), one sti l sees over many a door in Bruges, the sign-board of the "Diamanzetter," who resides within.

Wood Gravel for Garden Walks.—Campeachy and Pernambuco woods, reduced to small pieces after the dye has been extracted, form an admirable substitute for gravel in garden walks, to the surface of which they communicate the warmth, softness, and elasticity of a carpet. As materials for road-making, they have long been employed in many parts of Belgium, and proved peculiarly successful when substituted for street pavement, of which an easy, noiseless motion is the main object.

Hemp made from Bean Stalks.—Every bean stalk has 20 or 30 fibres running up on the outer side under a thin membrane from the bottom to the top of the plant. There is a particular fibre at each of the four corners of the plant, rather thicker and stronger than the rest; it is sometimes made use of by anglers, instead of sea grass, for fixing their hooks. These fibres are easily separated after the plant has been soaked 10 or 12 days in water. Washing and pulling it through hackles or iron combs is necessary in dressing bean hemp. It is not requisite that the stalks should be kept exactly 12 days under water; they may remain any length of time, so that they are either quite under water or perfectly dry.

Advantage of Planting Fruit Trees on Declivities.—Dodart first observed that trees pushed their branches in a direction parallel to the surface of the earth. If a tree stands on a steep it pushes both towards the hill and towards the declivity; but on both sides it still preserves its branches parallel to the surface. As there is an attraction between the upper surface of leaves and light, I am also pursuaded, though not equally certain of it from experiment, that there is an attraction of the same nature between the under surface of leaves and the surface of the earth. This I consider the true cause of the phenomenon. I had long observed that the most fruitful orchards and most fertile trees are those planted on a declivity, and the steeper it is, though not quite a precipice, the more fertile they prove. It is well known that the spreading of trees always renders them fruitful. On a plain they incline to shoot upwards; and therefore art is employed by skilful gardeners, and applied in various ways, to check their perpendicular, and to promote their lateral growth. But this point is obtained on a declivity by nature. There a tree loses its tendency to shoot upwards, and in order to preserve its branches parallel with the surface, is constrained to put them in a lateral direction. Hence an important rule in the choice of orchards and fruit gardens.—*Rev. D. J. Walker.*

Cobalt Mine in the Pyrenees.—It is stated in the *Journal de Toulon* of the 18th of Feb., that a rich Spaniard has just undertaken to recommence working the famous cobalt mine of St. Jean, in the Spanish valley of Gistam, on the frontier of the department of the Hautes-Pyrénées. This mine had been long worked by the Germans, on account of the grant which was made of it to them by Philip IV., King of Spain.

Steam Bridge.—A striking use of the steam engine has been adopted at Portsmouth; it is a floating bridge, seventy feet long and sixty feet wide, impelled by two engines of twenty-horse power, and making the passage (2,200 feet) at the speed of about 350 feet in a minute. The bridge draws, with all its machinery, but two feet. This capital invention will supersede the awkward contrivances of bridges of boats on the great European rivers.

Length of Days.—At Berlin and London, the longest day has sixteen and a half hours. At Stockholm and Upsal, the longest has eighteen and a half hours, and the shortest five and a half. At Hamburgh, Dantzic, and Stettin, the longest day has seventeen hours, and the shortest seven. At St. Petersburgh and Tobolsk, the longest has nineteen, and the shortest five hours. At Torneo in Finland, the longest day has twenty-one hours and a half, and the shortest two and a half. At Wardorbus, in Norway, the day lasts from the 21st of May to the 22d of July, without interruption; and in Spitzbergen the longest lasts three months and a half

Extraordinary Tenacity of Life in a Pike.—About seven weeks ago the workers on an estate in the vicinity of Ayr were employed in scouring a large drain; the stuff that was thrown out of it was carted away, and laid into a heap in order to be made into compost. During the process of mixing it with lime, which was begun about five weeks after its being laid up for that purpose, one of the laborers observed something stirring under the heap, and about eighteen inches below its original surface, on removing the earth, he found, much to his surprise, a pike weighing 4½ pounds alive and hearty, and disposed to fight for liberty. Self-preservation induced the workman to destroy it, greatly against the wishes of a worthy son of Erin, who bawled out as he took to his heels, "run boys, hurry! hurry! for by the proker it's a snake, and a wopper too."—*Ayr Advertiser.*

Longevity of the Eel.—At the close of the last century an eel from three to four inches long was taken from the river Cart and put into a small well at Gockstone. From that time to the present it enjoyed itself, and seemed to thrive, though in this circumscribed habitation, till a few days ago it was noticed less lively than usual, and in a day or two after it was found lifeless at the bottom. When taken out it was about a yard in length, and in thickness

about that of a man's wrist. After being thus known upwards of forty years, it appears to have died purely from old age, being found quite grey on the back and head. The only remarkable incident in its history was that on a young eel being put in the well a few years back this aged possessor of the limpid pool showed so little relish for company, or its new associate, that it soon destroyed the stranger.

Pepper is the produce of *Piper nigrum*, a shrub growing in India. The seeds are berries, round, hard, having an aromatic smell, and a hot acrid taste. These berries constitute pepper. The unripe berries are the common *black pepper*, while the ripe berries deprived of their epidermis constitute *white pepper.—Thomson's Vegetable Chemistry.*

VARIETIES.

The Revenue.—The accounts of the revenue, made up to the 5th inst., represent the income for the year ended April 5, 1840, to be £44,985,166; for the year ended April 5, 1841, £44,675,886. The decrease on the year is £309,280. The income for the quarter ended April 5, 1840, is £8,679,714; for the quarter ended April 5, 1841, £8,609,200. The decrease on the quarter is £70,514. On the year ended April 5, 1841, as compared with the year ended April 5, 1840, there is a decrease in the Customs of £301,042, and in the Post-office of £833,000. There is in the Excise an increase of £489,299, in the Stamps of £162,722, and in the Taxes of £275,019. On the quarter there is a decrease in the Customs of £54,115, in the Excise of £44,526, in the Post-office of £27,000, while in the Stamps there is an increase of £19,216, and in the Taxes of £42,987. There would have been an increase in the revenue of the year upwards of £520,000, but for the diminution in the revenue of the Post-office.—*Morning Chronicle.*

National Debt.—The Commissioners for the reduction of the National Debt, gave notice in last Tuesday's Gazette, that as the expenditure for the United Kingdom for the year ended January 5, 1841, exceeded the income by £1,590,970 15s. 2¾d., no sum can be applied on account of the sinking fund.

Silver Coin.—A return lately moved for by Mr. J. Pattison, M.P., states the total amount of silver monies coined at the Mint from 1816 to 1840 (both inclusive) to have been £11,108,265 15s., being a yearly average of about £444,330. The total amount of seignorage received on the said silver coinage was £616,747 8s. 2d., out of which the sum of £135,084 19s. was paid into the Exchequer pursuant to the act 7 William IV., cap 9.

Gas and Waterwork Bills.—In the House of Commons on Thursday, Mr. Sheil stated, that it was the intention of the Board of Trade in all future bills relating to gas and waterworks companies, to require the insertion of a clause, limiting the amount of profits to be derived to 10 per cent.

Malt for Distilling.—It appears by a Parliamentary return that the quantity of malt used in the distilleries of the United Kingdom in the years 1839 and 1840 was as follows: —In 1839, the malt used in England was 237,072 bushels; in Scotland, 3,321,754; and in Ireland, 664,516; altogether, 4,223,342. In the year 1840 the quantity used was, in England, 238,263 bushels; in Scotland, 3,312,619; and in Ireland, 486,240. Total, 4,037,122. It will be perceived that the quantity used by the Scotch distilleries is by far the greatest.

Customs Duties.—The net receipts of all the custom-houses throughout the United Kingdom, in the years 1839 and 1840, were as follow—in England, the net receipts amounted in 1839 to £18,062,770, and in 1840 to £18,425,449 (in round numbers.) In Scotland, in 1839 to £1,487,460, and in 1840 to £1,530,463. In Ireland, the net receipts amounted in 1839 to £1,792,451, and in 1840 to £1,907,496.

Present of Doves to the Queen.—In the last week the Council of the Zoological Society made a present to her Majesty of four fine Barbary doves, which have for some time been at the menagerie. These beautiful birds are principally distinguished by a coronal round the neck. It may be observed that both at Buckingham Palace and Windsor Castle the Queen possesses a rich aviary of British and exotic birds.

The Nelson Memorial.—Prince Albert has presented a donation of one hundred guineas towards the erection of the Nelson memorial in Trafalgar-square.

The Niger Expedition.—The commanders of the three ships for this expedition, viz., the Albert, the Wilberforce, and the London, have each received a gold pocket chronometer from Prince Albert, as a mark of the interest he takes in the enterprise.

New Trousers for Prince Albert.—The following paragraph appears in the *Limerick Chronicle* of Monday:—"Michael Lyons, the Garryowen weaver, this day completed the model pattern of trousers for Prince Albert. It is a fabric of mixed cotton and worsted from his own loom, and perfectly finished without either stitch or seam.

Royal Polytechnic Institution.—The late remarkable fine weather has had the effect of drawing crowds of visitors to this institution, nearly six thousand having paid for admission last week, many of whom were attracted thither for the purpose of inspecting the miniature portraits taken by the Daguerreotype process.

Presents to the United Service Institution.—Amongst the presents lately made to the United Service Institution was the military sash which was used in carrying Sir John Moore from the field of Corunna, after he had been fatally wounded. The men in the hurry attendant upon that disastrous day took the sash from the General's aid-de-camp, and encircling Sir John Moore with it held the ends of the sash. Thus they conveyed the wounded soldier to the town, and afterwards with the help of it let the lifeless body into the grave that was prepared for it on the ramparts. Lieut.-General Paul Anderson, the gallant aid-de-camp of Sir John, presented this interesting relic to the institution. Previous to the action Sir John Moore made General Anderson promise that wherever he fell there he should be interred. On the day the sash was presented the following were also given to the institution:—A bottle of wine from the Royal George; a rope from the Edgar, sunk in 1711; two Karbyle swords (the Karbyle Arabs inhabit the mountains in the rear of Algiers, and have always been independent of the Deys;) three Chartist pikes, used at the attack on Newport; and a complete collection of arms and implements of the Nagas, a tribe inhabiting the hills near Munipoor, India. The donors were F. W. M. Sadler, R.N.; Captain Michael Quin, Captain Howells, and Major J. G. Burns, son of Robert Burns, the poet.

Emigration.—There were last week, thirty vessels in the London and St. Katharine's Docks fitting out to convey emigrants to Sydney, Hobart Town, Canada, New York, and to the infant colony of New Zealand, which are to sail during the present month, and they will carry out in all about 5,000 passengers. The tide of emigration seems to be setting in for New Zealand, and the ships bound to that colony take out bricks as ballast, which fetch large prices in the colony. One ship in the London Dock contains 6,000 bricks, and will, besides, take out the materials of a house for one of the officials lately appointed by Government to manage affairs in New Zealand. The house can be put together in 24 hours. In a few months there will be many houses in the Bay of Islands built of English bricks.

Strathglass Lead Mine.—Lord Lovatt has leased out to an English gentleman, Mr. Thomas Dodd, the lead mine lately opened on his lordship's property in Strathglass. The mine consists of lead ore and barytes, is five miles in length, by two and a half in width. The object of Mr. Dodd is to form a company for working the above mine, by raising a capital of £4,000 in shares of £4 each.—*Caledonian Mercury.*

New Suspension Bridge at Hungerford Market.—Preparations have already commenced for constructing a suspension bridge across the Thames from Hungerford Market.

Improvements at Knightsbridge.—The Woods and Forests have, at last, given their sanction to Mr. Cubitt's plan for the improvement of Knightsbridge. The "Albert gate" into Hyde Park will be in the centre of a double crescent; but, as the ground to be occupied is church land, an Act of Parliament must be first obtained. Mr. Cubitt's plan is to erect magnificent edifices of Portland stone. The removal of Goding's brewery will take place immediately, and the site will afford ample space for the exercise of the talents of the architect.

New Steam-ships of War.—The following are the steam-vessels ordered to be built—Sampson and Gladiator, first class; Sphynx and Infernal, second class, at Woolwich; Virago and Bulldog, second class, at Chatham; Cormorant and Rattler, second class, at Sheerness; Beelzebub and Centaur, first class; Thunderbolt and Scourge, second class, at Portsmouth; Vulture and Janus, first class; Spiteful and Inflexible, second class, at Pembroke. Total, 16.—*Naval and Military Gazette.*

American Transatlantic Steam Ships.—It is stated in the last accounts from the United States, that the general government have determined to support Mr. Collins in his plan of establishing an American line of steam packets to trade with England. These ships though not yet on the stocks, the American newspapers affirm, are to make the passage in ten days.

Railway Travelling.—Some time ago a gentleman in York undertook to perform a journey from York to the metropolis, and arrive again in York, within 24 hours. The attempt was made during the present week. The party alluded to started from the railway station at York at 45 minutes past 8 o'clock, and arrived in London precisely at half-past 7 o'clock the same evening. He transacted business with one or two parties in London, and availed himself of an opportunity of visiting Covent-garden Theatre, where he remained upwards of a quarter of an hour, and after taking a stroll through the market, and purchasing sundry early productions, returned by the mail train to York, where he arrived, with comparatively no fatigue, the following morning, at 10 minutes before 8 o'clock, thus completing the whole journey in 23 hours and 5 minutes, a total distance of 450 miles.—*Doncaster Gazette.*

Murderous Attack on a Railway Station Man.—A most sanguinary outrage was committed on Saturday morning on the man who is left in charge for the night of the Wingfield station, about 12 miles north of Derby, on the North Midland Railway. He books night passengers, and receives and delivers the mail bags. A knock being made at the door, he opened it, when he instantly received a blow on the skull with a weapon so heavy and so sharp that it split up about two inches in length of the cranium, without producing any concussion on the brain. He instantly put his hand to his head, when he received another blow, which severed three of his fingers so perfectly that the detached parts fell to the ground. There were two men at the door, but the night was so dark that he could not distinguish their persons. After the second blow had been given, the man who struck it retired from the doorway a short distance, as if for the pupose of preparing to strike a third time, when the wounded man succeeded in pushing the door to, and the lock having a spring bolt, it became fast. This rendered the men outside furious, and they instantly commenced an attempt to break in through the windows. There is a bell on the building, and the wounded man succeeded in making his way to it and ringing it. The sound of the bell stopped their murderous purpose, and they fled. The sufferer, never losing his presence of mind, sought for something to stop the loss of blood, and found a quantity of cotton waste. He bound this very tight over his mutilated hand, and pressed a quantity on the opening in his skull, which seems to have saved his life. He fainted, and was found in a state of continued syncope when the Alfreton mail-cart arrived. The driver, with great promptness, lifted him into his cart, and drove him to the house of a surgeon at Alfreton, where he now lies. He had sufficiently recovered in the course of Sunday to give the above account.—*Northampton Mercury.*

Messrs. Wright's Banking House.—We are informed that the Commercial Bank of London has purchased the premises formerly belonging to Messrs. Wright and Co., in Henrietta-street, Covent-garden, lately vacated by the London Joint-stock Banking Company. It is also stated that the Commercial Banking Company have promised some provision, in proportion to the profits of the concern, for the family of Mr. Wright Biddulph, who has been so faultlessly and innocently ruined by the failure of Messrs. Wright and Co. We assume that this benefit to Mr. Wright Biddulph's family is in consequence of some wealthy members of the Catholic community having transferred their banking business to the Commercial Banking Company.—*Morning Chronicle.*

Manufactures of Berwick.—There has of late been a great and gratifying increase in the manufacture of articles of iron in this place, all the three foundries having been for some time in full and active operation. The schooner Leith sailed on Saturday last for London, with a cargo of 160 or 170 tons weight, consisting of miscellaneous articles manufactured at Helen Iron-works, varying from 12cwt. to a few pounds each. This is by far the largest exportation of this species of manufacture ever sent from this port. Mr. Guthrie employs between 80 and 90 workmen at the Helen Iron-works, and 40 or 50 at the old foundry, and a large number are also employed by the Messrs. Robertson in their extensive establishment at Tweedmouth.—*Edinburgh Advertiser.*

Defective Stamps.—Letters with defective stamps are charged by the Post Office authorities the same as if stamps were not attached to such letters, so that the receivers of defective stamps are mulcted for the negligence at the Stamp Office.

Earthquake at Zante.—Extract of a letter from Zante:—"On the 26th of February, after three days and nights of incessant rain, attended by a violent gale of wind, a most alarming shock of earthquake was felt about seven in the evening. It was not so disastrous as that of the 30th of October, but the duration was much longer, the vibration being continued from thirty to thirty-five seconds, while the former lasted only eight or nine. The consternation was general and extreme. The streets were in an instant filled with the terrified people, eager to fly, but not knowing where to seek safety. In their houses they dreaded being buried in ruins; in the streets they were drenched with rain. The churches were all filled, it being the hour of the evening prayers to the Virgin, offered up every Friday during Lent; and the cries and confusion were terrible. Only a few houses fell either in the town or the surrounding country; others were more or less shaken, and, as the shocks recur daily, we have every reason to fear that in the end the town will become a heap of ruins. After the earthquake of October 30, which destroyed nearly all the houses on the island. Zante experienced successive shocks, more or less strong, during forty days, making the number amount to no fewer than 259, and during the remainder of 1840 vibration of the earth, more or less perceptible, nearly every day. All the violent shocks were attended with dull rumbling sounds and subterranean explosions. Sometimes these noises were heard without being succeeded by any vibration, and sometimes the shocks were silent. Since 1514 Zante has experienced twenty-one earthquakes. That in 1514 divided the hill on which the fortress stood, and buried part of the ancient town in the ruins. In 1767 the shocks were repeated for three months, during which an epidemic disease prevailed. In 1791 the great shock lasted several minutes, caused immense damage, and was followed by minor shocks for six weeks. In 1820 the earthquake, which once more desolated the island, was preceded by a single flash of lightening. That of 1837 lasted with great intensity for twenty seconds; and that of 1840 was the most disastrous of all."

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Chambers' Information for the People.	Mirror.
Civil Engineer and Architect's Journal.	Mining Journal.
Gardeners' Gazette.	People's Magazine.
Glenny's Gardeners' Gazette.	Philosophical Magazine.
Gardeners' Chronicle.	Polytechnic Journal.
Gentleman's Magazine.	Provincial Medical and Surgical Journal.
Lancet.	Railway Magazine.
Law Magazine (Monthly).	Railway Times.
Legal Observer.	Railroad Quarterly Journal.
Literary Gazette.	Repertory of Arts.
	Spectator.

ACTS OF PARLIAMENT.

PATTERNS,—
27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17. (The last relates to patterns and *models*.)

PATENTS FOR INVENTIONS,—
2 and 3 Victoria, c. 67.

SCULPTURES,—
38 Geo. III., c. 71.

ENGRAVINGS,—
7 Geo. III., c., 38; 17 Geo. III., c. 57.

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8 Anne, c. 19: 12 Geo. II., (Booksellers' Act), c. 36; 15 Geo. III. (Universities' Act), c. 53; 54 Geo. III. (General Copyright), c. 156.

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A WEEKLY BRITISH AND FOREIGN MISCELLANY OF

SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

No. 90.] SATURDAY, APRIL 17, 1841. [PRICE FIVEPENCE STAMPED. CIRCULATING FREE BY POST.

MECHANISM OF THE PRINTING PRESS.

There is no machine to which the world is so much indebted as to the printing press; and we may venture to say there is none in which the application of power to the work to be performed is so admirably adapted as in the press invented by Lord Stanhope, and the other modifications of it subsequently contrived. For the purpose of enabling those of our readers who are not acquainted with the construction of these machines to appreciate their merits, we shall state, briefly, the objects necessary to be accomplished, and the methods formerly adopted for attaining them.

What printers term a "form" is the type with which one side of a sheet of paper, however large, is printed. The type is fixed into an iron frame, called a "chase," by wedges driven with great force, and the immense mass composed of single letters is thus held firmly together; so that it may be carried about without any single type dropping out. The eight pages, for instance, of which one side of this paper is composed when the sheet is opened, are all fixed into one iron frame, and the average number of letters each form contains amounts to nearly one hundred thousand. To produce an impression on paper of this large number of small letters, if taken at once, requires much greater power than would be conceived by those who have no experience on the subject. The smaller the type the more powerful is the pressure required, and it would be impossible even with the improved application of power in the Stanhope plattin presses to take the impression of the whole surface at once of such a paper as the *Times* by the strength of one man alone. To print a single solid column of our journal would require a pressure of almost 300 lbs., therefore the power required for printing one single form containing twenty-four columns may be estimated at 7,200 lbs. This force must be applied twice to every sheet to perfect the impression on both sides; consequently this sheet has been subjected to a pressure of nearly four tons.

Though great power is essential to produce an impression from types, this is only one of the requisites of the printing-press. The machine must be so adapted that the pressure be steady and be communicated perpendicularly, otherwise the impression would be smeared and indistinct. In the common mode of printing, the types are placed on a moveable table, where they are inked, the damp paper is laid over them, and blankets or cloth between parchment are placed over the paper, by a contrivance which is called a tympan and frisket. The table with the types, blankets, &c., is then moved under the plattin, which is that part of the press that is forced down upon the types to produce the impression. Now it is important that there should be sufficient space between the plattin and the types for the blankets and paper to run clear under it without rubbing, otherwise the paper would be shifted and smeared by the ink on the letters.

In the common wooden printing press, which was the only one in use till the beginning of the present century, the pressure was produced by a long lever arm, which turned a screw that forced down the plattin. The lever could not conveniently be made to describe, in working, more than the fourth part of a circle, before the full force of the pull was made to bear on the types, consequently it was necessary to have the thread of the screw large, so that in the fourth part of a turn the plattin might be lifted sufficiently high to clear the tympan, and permit it to pass underneath without rubbing. As the thread of the screw was thus large the mechanical advantage that might be derived from it was proportionally diminished, and the power obtained in a press of this kind was limited.

The bar and handle of the wooden press are about three feet long, and at each pull the bar makes about a quarter of a revolution of a circle, the space described by the part of the handle where the power is applied is therefore about four feet. If we take the distance moved by the plattin before the full force of the pull is exerted at one inch, though it is scarcely so much, the relative spaces traversed by the power and the point where the resistance acts would represent a mechanical advantage in the wooden press of 48 to 1, without allowing for friction. If then a power of 100 lbs. be applied at the handle, the total pressure on the types would be equal to 4,800 lbs. This amount of pressure it will be perceived is insufficient to print a paper the size of the *Inventors' Advocate*. In order to obtain power adequate to produce an impression from a full form it would be therefore necessary to reduce the size of the plattin, so as to concentrate the power into half the space required, and to print the sheet at two pulls. The inconvenience attending this is, that the impression at the parts where the separate pulls unite is liable either to be double, or else to be stronger and blacker than the rest of the sheet. There is also some time lost, though not much, in giving the second pull.

In the wooden press the descent of the plattin on the types, and the movement of the bar, bear the same relation to each other at every point; that is, according to the proportions we have before assumed, in the ratio of 48 to 1. It occurred to the late Earl Stanhope, that as the power was only required to operate effectively when the plattin pressed on the types, a press might be so contrived that by a combination of levers the first movements of the handle should bring down the plattin more quickly, and that the whole force of the combined levers might be brought to bear at the time only when the power was exerted. After numerous experiments he succeeded by the aid of the late Mr. Walker, machinist, of Dean-street, Soho, in perfecting a press on this principle. Two levers in addition to the pulling-bar were applied in such a manner that at the commencement of the pull, when little power was required, they acted with a mechanical disadvantage, and the slightest movement of the bar brought the plattin down quickly. As the plattin began to bear on the blankets the levers came into a position more favorable for the power, until at the point of greatest pressure the force exerted exceeded the power employed more than a hundred-fold. The power gained by this arrangement of the levers is so enormous that the thick cast-iron cheeks of the Stanhope press were frequently rent asunder, and it became necessary to have them made stronger.

By this admirable adaptation of the power to the work, great advantages have been gained, and the old wooden presses have become almost obsolete. Lord Stanhope did not take out a patent, but allowed the public unreserved advantage of his invention. Several attempts at improvement have since been made on the Stanhope press, in which the same principle is differently applied. Some of these presses are more powerful than the original, but there are none of the iron plattin presses which surpass the original in general utility.

The invention of Lord Stanhope was quickly succeeded by another improvement in the printing press, which has produced a much greater revolution

in the art than any before introduced. The roller machines, which is now generally used for printing large sheets, possesses immense advantages in rapidity of execution over all former contrivances, though its mechanism does not display so much ingenuity and adaptation of power to required circumstances as is manifested in the contrivance of the Stanhope press.

In the printing machines now employed the form to be printed is placed on a table which moves backwards and forwards, like the bottom part of a mangle. Above the form, at regulated distances, are rollers covered with blankets, on which the paper to be printed is placed. These rollers press on the types as they pass underneath, and the paper receives the impression gradually as the form moves along. An inking roller inks the surface of the letters as they pass from one roller to the other, and the impressions continue to be reproduced on the paper placed on each large roller as quickly as the types move from under one to the other. A machine of this kind put in motion by a day-laborer, with boys to lay on and take off the paper, will print two thousand sheets, the size of our journal, on one side in an hour; which with an iron press of the best construction would be considered eight good hours' work by two skilful pressmen. By the application of steam power the rapidity of printing by this means is still further increased, and in one hour four thousand impressions of the double *Times* newspaper, perfected on both sides, are now printed.

It would be almost impossible to obtain an impression of such a paper by a plattin press, but if the work were divided and the sheets were printed at four separate times, as would be necessary without the rolling machine, this work would occupy two pressmen for sixty-four hours, which now requires only one.

The greater power gained by the printing machines arises from the concentration of the pressure on a part only of the types at a time; while in the plattin presses the pressure bears on the whole surface at once. It may be readily conceived, therefore, that a child by turning a roller which presses on only a hundredth part of the surface might produce a stronger impression than the strength of a man can effect when bearing on the whole.

METHOD OF OBTAINING STEEL OF DIFFERENT COMPOSITIONS AND QUALITIES.

In a memoir on the manufacture of cast steel at St. Zlataoust, the imperial manufactory of swords and of iron, situated in the southern part of the Oural mountains, Colonel Anasof describes the processes adopted in that manufactory to produce the steel in earthen crucibles by the fusion of bars of iron and steel by means of blast furnaces. The peculiarity of this process consists in this; that iron is put into the crucibles covered with charcoal to submit it to a kind of cementation, whilst in England steel previously cemented is employed. In other respects there is nothing new in the method adopted, but it may be serviceable to state, briefly, the means indicated by the author of the memoir of obtaining steel of different varieties in its composition and qualities. The following are his observations on this point.

"The processes adopted for the fabrication of steel are sufficient to show the principal causes which tend to vary the qualities of this metal; as, for example, the quantity of carbon absorbed by the iron and the nature of the iron itself. As the first of these causes may be regulated at will, it requires no explanation, and the second need not now be considered. I will therefore confine myself to the rules that I have formed, which are the results of a great number of experiments.

"1st. The purer the iron, that is, the more free it is from other substances, the better will be the steel procured from it; but the cementation will require longer time.

"2d. All qualities of soft iron are not to be preferred to brittle iron; for if the hardness of the latter be caused by the carbon it contains, it is preferable to soft iron, of the same qualities in other respects.

"3d. The aptitude of the iron to be converted into steel depends more on the quality of the iron ores even than on the preparation of the iron. For instance, the iron procured at Zlataoust, from the ore extracted from the Tesminck mine, is preferred to that of all the other mines in that neighbourhood; and the iron from the iron works of Tagilsk produces steel of a superior quality to that from Zlataoust.

"4th. The steel clippings from the swords made with cemented steel produce cast steel of a quality little superior to that of the clippings of iron.

"5th. The bars of iron which have been buried underground for some time produce steel of a quality superior to that obtained from iron which has been recently manufactured. This fact was known in Asia in the most ancient times, but Europeans having forgotten the lessons of their masters in metallurgy have been in arrear of those nations, not only in the art of making the best steel, but also in the knowledge of the signs by which the perfect article can be positively ascertained If we are well informed, one English cutler at least, Mr. Weiss, has satisfied himself of the superiority for making steel of iron which has remained a long time under water.

"6th. The clippings or pieces of iron which have been a long time exposed to the air produce worse steel than fresh iron.

"7th. The steel is of better quality when the pieces of iron are homogeneous and of equal size.

"8th. The steel is softer when the opening in the crucible for the proof is small, provided that the pressure of the iron be equal up to the time the lid is put on the crucible.

"9th. If the workman have neglected to put the lid on in time, he may render the steel of good quality by adding as much iron as is necessary to raise the metal to the proper height.

"10th. If at the time of the final proof the steel does not send forth sparks sufficiently bright, the evil indicated by this bad sign may be remedied by introducing through the opening of the crucible two or three pieces of iron of the weight of about half a kilogramme.

"11th. The fusion of the steel mixed with powdered charcoal or soot in determined proportions, and in a closed crucible, as proposed by Messrs. Mushet and Bréan, might, indeed, produce steel, but its degree of hardness would be much less certain than on the plan I have described. In fact, if the charcoal be in excess the steel will become too hard; if there be not enough, the metal will be difficult to fuse, because a part of the charcoal will be volatilised.

"12th. The addition of other metals, such as platinum, silver, or gold, in the proportions of 1·5 to 1·2 per cent., somewhat improves the quality of the steel, but the more pure the steel is, the less advantageous do such additions become. The effect of the addition of these metals consists principally in making the steel more easily forged, the proportions of carbon and iron being equal.

"As to brittle metals, their mixture with steel is always more or less injurious, and this becomes more apparent in proportion as the quantity of the alloy is increased."—*Moniteur Industriel.*

SMELTING IRON WITH ANTHRACITE COAL.

[From the report of the directors of the Coal Mining Association of Schuylkill County, U. S.]

The important object of smelting iron with anthracite coal, which has lately claimed so much attention, we mentioned in our last report as having been accomplished, and then in successful operation in this place, since which time five other furnaces have been put in blast—viz., one on the Lehigh, near Allentown, one at Phœnixville, one on Roaring Creek, near Cattawissa, and two at Danville. And at Danville two more are already built, that will shortly go into blast; and at Shamokin one stack has been built within the past year, which will soon be put into operation; and we learn that the valley furnace, situate about five miles east of Pottsville, has been rented, and will be put in operation as early as possible the ensuing summer. The number of furnaces using anthracite coal will no doubt be steadily increasing, since it has been satisfactorily settled that there is no difficulty in using this kind of fuel: and the iron, which was apprehended by many would be inferior, has been proved to be of a superior quality, particularly for castings, by possessing more fluidity when melted, and subsequently more compactness, strength, and smoothness.

In the report of the committee of judges on iron and steel, in the Franklin Institute of Pennsylvania, we find the following remarks on a specimen of anthracite iron:—"One piece of iron from anthracite pig-metal, from the Crane Iron Works, made into bar-iron at the Boontis Works, with anthracite coal.—This iron is of good quality, and deserves to be particularly noticed, as it goes to establish the fact that good iron may be made with anthracite coal exclusively, and also with a great saving both of metal and fuel; it is stated by the makers, that the whole waste of metal during the conversion does not exceed 12 per cent. Such facts we think are very encouraging to those engaged in making these experiments."

COMPARATIVE ADVANTAGES OF LONG AND SHORT STROKE ENGINES AND CONNECTING RODS.

In a paper recently read by Mr. J. Seaward, before the Institution of Civil Engineers, which is published in their proceedings, the comparative advantages in steam-engines of long and short strokes and of long and short connecting rods, are thus stated:—

"Remarks on the Comparative Advantages of long and short Connecting Rods, and long and short stroke Engines," by J. Seaward—The engines first placed on board the steam-frigate the *Gorgon*, are constructed on the principle of "direct action," that is, the power is communicated directly from the piston to the crank, without the intervention of side levers, and the other parts usually employed in the construction of marine engines; this is one leading feature. Another is, that the main shafts are placed directly over the centre of the cylinder; and as these shafts are carried by strong frames and wrought-iron columns standing upon the cylinders, the force of the engines is confined between the cylinders and the frame, and thus isolated from the sides of the vessel. Other advantages accruing from this construction are, in the author's opinion, a saving of space and weight, the absence of the vibration resulting from the action of the side levers, and a more efficient application of motive power, arising from the simplicity of the construction and diminution of friction. Two main objections have been urged against this system—first, that the shortness of the connecting rod causes a loss of effect; and second, that the shortness of the stroke is a disadvantageous application of the power of steam. The arguments in support of these objections are combated at considerable length. With reference to the alleged loss of power by the use of the short connecting rod, it is argued, that as no arrangement of long or short rods or levers could create power, so no arrangement of similar parts

could be productive of loss of power. A geometrical investigation of the force actually exerted on the crank by long and short connecting rods is then given, and the result deduced is, that by adding together the whole of the force exerted by the two kinds of connecting rods respectively, during one entire rotation, they both give the same actual amount; thus proving, that no loss arises from the use of the short connecting rod. It is admitted, that there is some increase of friction on the journals of the connecting rod joints, but this occurs only at the extreme angles; some allowance is also to be made for the increased angular motion about the lower joints of the rod, but they are not collectively of sufficient importance to be considered as any objection in practice. The calculations given are under the approval of Professor Airy, who thus expresses himself:—"The *greatest* force of the *Gorgon* engines (when both cranks are below the horizontal line) is *greater* than the *greatest* force with common engines, but the *least* force is not less than the *least* force with common engines." The whole power, in a complete revolution of the crank, is the same in both. That a long stroke engine, under certain circumstances, may be more advantageously employed than a short one, is admitted; but considering the steam-engine *per se*, it is argued, that the latter possesses no advantage over the former. In two engines of equal power, equally well constructed, the length of the stroke being respectively eight feet and four feet, the cylinder of the latter having double the area of that of the former, making the same number of revolutions per minute, and having the steam passages and valves of the same area, it is clear, that the mechanical action of the steam must be identical, because the same volume of steam will produce an equal mechanical effect, whether it be introduced into a long narrow cylinder, or into a short wide one; setting aside the effect of working expansively, which, however, is not at all affected by the shortening of the cylinder; for it is just as practicable to shut off the steam at one-half, one-third, or one-fourth of the stroke of a short cylinder as of a long one. The most essential differences between these two engines must be in the relative amount of friction, and of radiation of heat from the cylinders and passages. In a well-made engine, four-fifths of the friction is due to the packings of the piston, air pump bucket, and stuffing-boxes, and about one-fifth to the gudgeons, crank pin, and other moving parts. The friction of the piston packing is as the circumference multiplied into the space through which the piston travels, and into the depth of the packing; therefore in a cylinder 30 inches diameter, 8 feet long, the friction of the packing will be as 24, while in a cylinder of 42.4 inches in diameter, 4 feet long, it will be only as 17. The same train of reasoning is extended to the other moving parts, and shows, that if the total friction in the short stroke be 100, that of the long stroke engine will be 123. The radiation of heat from the cylinders will be as the relative areas of surface, which is less in the short stroke than in the long. An examination of the comparative friction of the moving parts of steam engines is entered into; rules for computing, and tabular results are given; and the author concludes by observing, that although the relative dimensions selected as examples are uncommon in England, they are not so in America, where pistons of marine engines frequently travel at the rate of three hundred to four hundred feet per minute. It is contended, that the speed of the piston is immaterial, provided the engine be well-proportioned to the speed; at the same time bearing in mind that a slow speed will be more favorable for the easy and pleasant working of the engine, and for durability. The paramount objects to be aimed at in the construction of marine engines are, the greatest saving of fuel, space, and weight, and the durability of the machine,; and as the question is not whether the stroke should be eight feet or four feet, but relates to a diminution from the present length of seven feet to probably six feet, it is contended, that the form of the *Gorgon* engines offers considerable advantages in the points treated of, independently of the positive diminution of weight and space, which forms no part of the immediate inquiry.

LARGE WATER POWER COTTON MILL AT GREENOCK.

(From the Greenock Advertiser.)

In our last we briefly narrated the proceedings which took place at the starting of the water-wheel at the Shaws Water Cotton Spinning Company's large mill, and in the present sheet we will give a more detailed account than we have yet laid before the reader, both of the mill itself, and of the matchless machine by which its numerous wheels, spindles, &c., are to be set and kept in motion.

The foundation stone of the manufactory was laid with masonic honors on the 15th June, 1838—the very day on which the railway was commenced. The mill is an oblong building 300 feet in length, 65 in width, and four storeys in height. The elevation is plain but chaste and elegant, and far surpasses in appearance any building of the same kind which it has been our lot to witness. The centre portion projects, with a pediment on the top, and finishes with an octagon belfry, on which is a vane resembling a first-rate steamer. There is a staircase at each end of the mill of very easy ascent, and with spacious landing places.

The flats being all exactly alike, a description of one will stand for the whole. Each room is 215 feet long and 61 broad. The ceilings, which are all lined with timber, are supported by two ranges of cast-iron pillars, of which there are forty in each room. Over these pillars are transverse beams, each nine feet apart. The apartments at the east end of the mill, which are intended for cotton and for blowing rooms, are all fire-proof. They are separated from the work-rooms by a stone gable—their ceilings are all of arched brick-work resting on cast-iron beams, and the floors are of Arbroath flags. Those at the west end are employed as a counting-room, and for warping and winding apartments.

A considerable part of the ground flat is already filled with throstle frames, with which the entire apartment is intended to be occupied. The second floor contains preparing machinery, such as carding, drawing, slubbing, and finishing fly frames, entirely for throstle spinning. The machinery in these two flats is the workmanship of Wm. Dunn, Esq., of Duntocher. The third flat contains the various kinds of preparing machinery for mule spinning only; and the fourth flat is to be filled with self-acting mules, on the principle, we believe, of Mr. Smith of Deanston's patent. It is supposed by competent judges, that, when the flat is in full operation, it will present a scene not to be matched in any manufactory of the kind in Great Britain. It is understood that one superintendent will be able to manage each apartment.

When fully at work, this mill will give employment to about 600 persons, and for their behoof the proprietors have already erected an extensive range of dwelling-houses, of the most comfortable and commodious description. Other houses are to be reared in due time, as it is desired that those employed at the work should live nigh to it. The stones of which they are built were blasted out of the tunnel.

The wheel-house stands at a distance of 21 feet from the east end of the mill. It is also a large building, of plain but neat design. Its length is 90 feet, and its breadth 33. The base is nearly 50 feet below, while the roof is about 35 feet above, the level of the road. From its bottom a tunnelled tail-race runs under the road in an oblique direction, for a distance exceeding 100 yards. This tunnel, a considerable proportion of which is 50 feet beneath the surface, and the under part of the wheel-house, have been cut through solid whinstone rock. The arch of the tunnel, and the arch on which rests the axle of the wheel, are all constructed of dressed free stone, the joints of which are all joggled and filled with cement. The stones forming the arch weigh from one to ten tons each, and the whole consists of 5,000 tons of dressed mason work, ten feet thick. The top of the wheel-house forms a fine arcade over the stupendous piece of mechanism from which its name is derived.

The wheel itself is the largest and most magnificent structure of the kind in the world. It measures 70 feet 2 inches in diameter, or 220 feet 6 inches in circumference, and with the stream furnished by the Shaws Water Company, it will work equal to 130 horse power; but, from the capacity of the buckets, and the strength of its parts, it is capable of working up to 200 horse power, with a full supply of water. It is constructed on what is called the tension or suspension principle: the shrouding or outer rings of the wheel being braced to the centre by 32 chain cable iron bars or arms, $2\frac{3}{4}$ inches in diameter, and an equal number of diagonal braces of the same thickness. The axle of the wheel is of cast iron, and weighs 11 tons. The bearings in which the wheel revolves are 24 inches long and 18 inches in diameter, resting in cast iron bushes. The centres or naves, into which the arms and braces are fixed with gibs and cutters, are ten feet in diameter, and weigh $8\frac{1}{2}$ tons each. They are of a ribbed form, with punched covings, and have prominent sockets, for receiving the ends of the arms. They have a rich and elegant appearance, and the arms radiating towards the periphery of the wheel, give an appearance of lightness to the ponderous machine. The shrouding is of cast iron, and is of 17 inches in depth. On the side which is not covered by the gearing, there are two sunk pannels with a neat "egg and dart" moulding all round the styles; and, in the body of each pannel, there is a very elegant branch of the water lily in bas relief, which has a very handsome effect, by relieving this part of the wheel from that inexpressive plainness which is usual in such structures, and yet does not partake of that inappropriate expression of misplaced ornament which too often gives a ginger-bread appearance when applied to large machines.

The weight of the wheel is 117 tons. The shrouding is composed of 64, and the teethed segment of 32 pieces, containing in all 704 teeth. The buckets are 160 in number, and each will contain 100 gallons of water. The sole of the wheel is constructed of iron plates fastened with no fewer than 20,000 rivets. The wheel performs nearly one revolution in the minute. The spur wheel and segment pinion, which works in the teethed segment of the water wheel, weighs with its shaft 23 tons, and the pinion and main shaft into the mill weigh 13 tons. The spur wheel, the diameter of which is 18 feet 3 inches, revolves at the rate of 600 feet per minute, and the whole act together so smoothly that not the slightest shaking or noise is perceptible.

The cistern conducting the water to the wheel is of iron rivetted together, and is supported by two large cast iron beams the full width of the wheel-house. The water strikes the wheel six feet from the top of the diameter. The governor for the wheel, which is of beautiful workmanship, and the rack for the sluice, are placed on a level with the cistern. The wheel itself, with all its accompanying apparatus, are the workmanship of James Smith, Esq., of Deanston, whose celebrity as a scientific mechanician is of the very highest order. Although, as already stated, the weight of the wheel exceeds 100 tons, it revolves as smoothly and steadily as a well-adjusted pinion in a time-piece. Indeed, it is impossible for any description to give an adequate idea of the effect produced upon the spectator by the calm, majestic, but resistless force with which it moves, never deviating by a hair's-breadth from its appointed sphere, and yet seemingly capable of rending to pieces the walls within which it is enclosed.

To the east of the wheel-house a capacious store for holding cotton wool has been erected. It is capable of containing 800 bales. The building is fire-proof, having an arched roof of brick-work and stone side walls. Besides, matters are so arranged that in the event of fire the whole could be covered with water in fifteen minutes.

Behind the wheel-house stands the gas work

for lighting the manufactory. It was erected by Messrs. Liddell & Co., of Glasgow, and the internal fittings are the workmanship of our townsman, Mr. James Duff. Its roof is formed by the troughs for conveying the water from the ordinary channel to the wheel, as is also that of the boiler-house for heating the mill by steam pipes.

The mill and the whole of the other buildings referred to were constructed by Mr. William Allison, builder. Mr. Thomas Lamb executed the joiner department, and the stability and beauty of the whole do immense credit to them both. All the shafting and gearing, which are of polished iron, are the workmanship of Messrs. Randolph and Elliot, of Glasgow, and have been deservedly admired by all who have seen them. But the most gratifying fact of all, perhaps, is this—that the vast amount of excavation and building, together with the putting of the many pieces of heavy and complicated machinery, have all been accomplished without a single life being lost, or even any of the persons engaged about it being seriously injured.

EXPORTATION OF MACHINERY.

The House of Commons committee to inquire into the laws restricting the export of machinery, to whose proceedings we recently made a short reference, have ordered the evidence thus far taken before them to be printed.

We find that in the years 1824 and 1825 committees sat to inquire into these and other laws relating to manufactures and industry, and that one result of their labors was the repeal of the laws forbidding artisans to emigrate. The feeling of the committee was also favorable to the repeal of the prohibitory laws on machinery, but manufacturers being then greatly on the increase, whilst our machine-making establishments were small, the manufacturers feared that the opening of the trade would increase the price of machinery at home, and otherwise impede their operations. The committee, therefore, recommended that the Board of Trade should continue to exercise a power which it had assumed of recommending the Treasury to grant licences (which were granted accordingly) for the export of certain descriptions of machinery which the law prohibited.

The committee now sitting has directed its attention to the condition of machine making abroad and at home under the strangely anomalous system of law and licence thus produced; and the evidence is full of interest and importance in its bearing upon this question and upon our manufactures generally. Mr. Hume, of the Board of Trade, was first examined, and he explained that by law all tools used in machine-making, which are of the most costly and elaborate kind (immense lathes, planing-machines, &c.) can go; steam engines and mill-gearing can go; whilst, under licence, all machinery used in the "preparatory" processes of manufacture (that is, in cleaning, carding, &c., the cotton or wool) is allowed to go; but none of the spinning or weaving machinery. The next witnesses were the Chairman of the Customs and three principal searchers, who stated the difficulty of distinguishing between prohibited and unprohibited articles, the vast extent and perfect facility of smuggling both machinery and models, and who expressed their opinion that no prohibitory law of this kind could be efficiently enforced. Mr. Patten, a Custom-house agent, confirmed their testimony from his own experience, and produced a return, showing that he had himself exported 9 or 10 tons of wooden models of prohibited machines at a time. The smuggling indeed consists now mainly of models, or model machines of the prohibited articles, though still much machinery goes for use. Evidence has also been adduced as to the condition of machine-making in foreign states, by Mr. Grenville Withers, a machinist of high reputation, who has resided 16 years abroad; Mr. Thomas Marsden, a machine-maker, at Manchester, who has recently returned from the execution in France of an order for £70,000 of flax machinery, and who has since declined another £25,000 order; Mr. James Cox, a machinist, who has spent many years in America; Mr. Peter Fairbairn, of Leeds, and Dr. Alexander Jones, an American machinist. Their evidence shows, that in Belgium, France, Switzerland, Prussia, and other continental states (but chiefly in the first named), and in the American states, vast machine-making establishments have been formed, the mode being to take over English workmen, and English tools of the best construction, which stand in lieu of manual skill, to smuggle over models of all new inventions and copy them; some of these establishments having agents here for the purpose. These parties, though producing more dearly, are yet able to compete with the English machine-maker, because the prohibition of export, enhancing the price some 40 or 50 per cent., operates by so much as a bounty to the foreigner; and, accordingly, except in some very delicate articles, we have already nearly lost the French, Swiss, and Belgian supply, and the last-named people are beginning to compete with us in third markets. They showed further, that the law operates to deprive England of orders even for those machines which she may export; the manufacturer who wants machinery preferring to go where he can obtain all that he wants.

The English machinists examined as to the state of our home manufacture have been, Mr. William Jenkinson, of Manchester, Mr. Matthew Curtis, of the same place (the successor of Mr. Dyer), and Mr. Peter Fairbairn, of Leeds. Each of these gentlemen stated instances in which they had refused or lost very heavy foreign orders, for Russia, Mexico, and other countries, and explained in how many prejudicial ways the prohibition affects them. For example, many of our most valued inventions have come from abroad, and foreigners having much skill to invent, but little power of adaptation, heretofore inventions have all flocked to England, as having the best machines and as being the best manufacturing market; in proportion, however, as foreign machine-shops increase, inventions are withdrawing from this country; and inasmuch as a man can import his inventions, but cannot re-export them, there is a positive loss to inventors and patentees in England. The consequence is, that all the great English machinists are forming connections abroad (Mr. Dyer has actually quitted Manchester, and formed an establishment at Amiens); and it was stated by Mr. Jenkinson (the chairman of the machine-makers at Manchester), in his evidence, that so oppressively did the law operate, especially on patentees, that the machine-makers as a body had discussed the propriety of forming on the Continent a joint-stock establishment for the supply to the Continent and America of those articles which are prohibited export.

All these parties are very confident in their expectation that a repeal of the prohibition would operate, not to cause a great and sudden demand from abroad for machinery (with which Belgium and France are already glutted), but to transfer to the machine-makers of this country the orders at present given to foreign establishments, and thus to break down the latter and give England the monopoly of the trade.

Evidence showing the bearing of the present law on manufacturers, and the probable effect of its repeal on the manufacturing interest, has also been taken, but to this we shall refer on a future occasion.—*Times.*

PATENTS OF INVENTION IN FRANCE.

The following observations on the advantages of protecting the products of inventive genius are taken from *Le Commerce*, having been suggested by the recent introduction into France of the process of felting cloth.

"It is under the protection of the patent law of 1791 that inventors can avail themselves of the conceptions of their genius. But although the deserved reward is granted to the invention, it has not been intended that the advantages resulting from it should last for ever; for after a lapse of time not exceeding fifteen years, the invention becomes public property, and manufacturers generally are allowed to make use of it. This is an incontestable encouragement for inventors; and the greater number of mechanical improvements may be attributed to the protection afforded by this law. Yet, notwithstanding there exists in the commercial world a strong prejudice against taking out patents, which tends to prevent manufacturers from deriving advantage from improvements or useful inventions.

"It is imagined (and we have heard experienced tradesmen and intelligent men sanction the mistake) that the guarantee granted by law is delusive and inefficacious, and that the law leaves an open field for counterfeits. Patents of improvement are, according to their ideas, the means of eluding prosecution; and that, thanks to this ingenious and easy method, the inventor loses the advantages that his invention ought to have secured him, and which are appropriated by artful men, who wait their time for grafting their devices on the tree of others.

"In this opinion there is an important error, and inventors ought not to be discouraged by it.

"Thus interpreted the law would be a trap, and that would not be admissible. No one, without the permission of the inventor, has the power of making use of the invention of others by merely some improvement in it. His privilege does not commence till the time when the original invention becomes public property. Neither does a slight alteration in a machine afford any security from prosecution; the principle of the construction must be altogether different; or, allowing the same principle to remain, the method of adapting it must be totally different. The courts of justice are extremely strict with respect to the question of counterfeits, and very justly so; for if it is right, if it is reasonable, to allow the inventor a compensation for his ingenuity and intelligence, it would be palpably unjust and wrong to encourage a legal fraud by affording the means of depriving that inventor of what constitutes his legal right.

"These reflections derive additional importance as it is under the sanction of this privilege that the admirable machines were constructed which have immortalised the Arkwrights, the Comptons, and the Cartwrights. The English patent law, which dates as far back as 1623, has powerfully contributed to the manufacturing pre-eminence of our neighbours. Thus French importations of English patents are frequent. Among the most recent of these the patent for the manufacture of felted cloths is indubitably the most important. We are indebted to M. Vouillon, a French manufacturer established in London, and to one of the directors of the felting company in England, for having introduced this invention into France. We mentioned it several months ago, and its introduction is likely to effect a complete revolution in the manufacture of cloth.

"A company has been formed, at the head of which is M. C. Depouilly, one of the principal manufacturers of France, for carrying on the manufacture of felted cloth in all parts of the country. The manufacture is not concentrated in certain isolated points, but it extends to all parts of the kingdom, and promises to become one of the staple manufactures of the country."

PATENTS.—BRITISH AND FOREIGN.

ENGLISH EXPIRED PATENTS.

Edward Cowper, of Clapham-road-place, for *improvements in printing music*, April 5.

James Shudi Broadwood, of Westminster, for *certain improvements in grand pianofortes*, April 9.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page 230.*)

Thomas Wood, jun., of Wandsworth-road, Clapham, Surrey, gent., for *improvements in paving*

streets, roads, &c., April 7.—The blocks used for paving are of two forms, viz., the section of the pyramid, having either a square base or an elongated one; and the double wedge, cut from either a similar square base or a similar elongated one.

The blocks are so disposed that every other block in one series is the section of the pyramid standing on its smaller end, and every other block in the next series is the section of the pyramid standing on its base; the intermediate blocks of both series being the double wedges. A number of such alternate series of blocks is placed across a road, and all the blocks are made to lean and press on each other on all sides in mutual support; half blocks being introduced at the sides to "break joint."

In putting down this pavement, those series of blocks that have the basss of the sections of pyramids upwards are left a little elevated, say half an inch, above the other series which have the bases of the pyramids downwards, until the pavement is laid; the elevated blocks are then rammed down to the level of the others, whereby the solidity of the road is greatly increased.

The modifications consist, Firstly,—In making those blocks that have the bases of the sections of pyramids upwards, half an inch taller than the rest, in order to give a firm foot-hold to horses, and by the traffic forcing these blocks down to consolidate the road.

Secondly,—On making those blocks that have the bases of the sections or pyramids downwards, shorter than the rest, in order to take the pressure on those blocks that support the adjoining ones.

Thirdly,—In making every alternate series taller than the others in order to afford a firm foot-hold for horses, and to cause the pressure to act on those blocks that have their larger ends upwards.

The patentee does not claim the two forms of blocks used in this method of paving, because they are mathematical forms, and are known to scientific men in general; but he claims the peculiar combination, construction, or arrangement of blocks of those forms which are described herein, and likewise the modifications of the peculiar combination.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(Continued from page 212.)

JOHN WORDSWORTH ROBSON, of No. 30, Wellclose-square, Middlesex, artist, for *a certain improvement or improvements in water-closets*, April 2.—This invention consists of an improvement in three kinds of water-closets, namely, ship's, portable, and house closets.

The following is a description of the ship's water-closet:—

The bed-plate is of brass or iron, having two pipes cast with and upon the under side thereof, resting in two mortices in the top of the bed-block, into which the bed-plate is let in level with its surface, and firmly bolted thereto. In the bed-plate are four holes, which we will distinguish by the Nos. 1, 2, 3, and 4. No. 1 is a circular hole, $2\frac{1}{2}$ inches or more in diameter, through which the soil and water pass from the basin into a tube leading to a cylinder, which is firmly fastened to tbe bed-block by bolts, and to the bed-block over No. 1, an ordinary hopper basin is fastened. The soil and water are drawn from the basin to the cylinder by a vacuum produced by raising an inverted conical-shaped leather top (provided with metallic plates at top and bottom), which forms the cover of the cylinder and performs the office of a piston. The hole No. 2 is within the cylinder, and is covered with a strong leathern valve, having a rim of the same width and diameter as the lower rim of the cylinder; it is placed under the lower rim of the cylinder, and prevents the escape of air or water between the cylinder and the bed-plate, to which it is firmly bolted. This valve is mounted with metal to assist in closing it after having been opened by vacuum in the cylinder.

When the soil and water in the basin have been driven into the cylinder, by raising the piston-rod, and withdrawing the leather cone from within the cylinder, the stroke is reversed, the valve is closed, and the soil and water in the cylinder are driven through the hole No. 3, into a tube leading to the hole No. 4, which is of the same size as Nos 1 and 2, and covered with a strong leathern valve exactly similar to that over No. 2.

This valve is within the soil-pipe head, which supplies the place of a valve box, and is of sufficient dimensions to permit the free working of the valve within it. The valve is opened by depressing the piston-rod within the cylinder, and forcing the soil and water therein into the soil-pipe head, and through the soil-pipe into the water, or other receptacle. It is closed by atmospheric pressure from without the soil-pipe, or by raising the piston-rod and leather cone within the cylinder.

Upon the top of the cylinder is a strong triangular-shaped upright, to which the valve-tap is firmly bolted, the tap being the medium through which the water passes from the cistern or other reservoir to the basin.

In the centre and lower part of this valve-tap there is a small stuffing-box, through the centre of which a small tube rises, and through which tube the tap-rod passes. The object of this stuffing-box and tube is to prevent any leakage when the valve of the tap is raised to admit water into the basin. Around this tube and over the stuffing-box there is an area or chamber in the tap, covered by a strong leathern valve, which being opened by raising the tap-rod admits the water into the area, whence it is conveyed to the basin by a small leaden pipe. In the upper part of the valve-tap there is a recess of sufficient dimensions to permit the valve to work freely within it, and from thence a small pipe proceeds to the cistern or reservoir which supplies the tap with water.

The portable water-closet is similar to the above, except that the tap-rod is worked by a lever, one end of which is fastened to the frame-work of the cistern and the other end to the lift piece, to the bottom of which there is a detached counter-balance weight, which rests against the end of the lever of the basin, and keeps the valve of the basin closed. When the lift-piece is raised, the valve of the basin opens, and the soil and water therein pass into the case or reservoir.

The parts that compose the house water-closet are very similar to those mentioned in the description of the ship's water-closet.

Claim first.—In the ship's water-closet, the bed-plate and tubes attached thereto, through which the soil and water pass from the basin into the cylinder, and from the cylinder into the soil pipe as described.

Claim second.—The leathern valves by which vacuum is produced within the cylinder, and in the valve-box or soil-pipe head, and the valve-box in which the valve is contained.

Claim third. — The inverted conical-shaped cylinder top, with the metal plates upon the top and bottom thereof, and the method of working the same (so as to obviate the necessity of a solid piston, cylinder top, and stuffing-box,) by creating a vacuum in the cylinder without friction, and by the application of less power than has ever before been used.

Claim fourth.—The valve tap in all its parts by which water is admitted into the basin, with the tap-rod, and the method in which the same are worked.

Claim fifth.—In the portable water-closet, the valve-tap by which water is admitted into the basin, the leathern valve at the bottom of the basin, and the method of working the said valve by a detached counter-balance weight attached to the bottom of the lift piece.

Claim sixth.—In the house-closet the bed-plate and tubes attached thereto, through which the water passes from the cistern or reservoir into the basin, and the leathern valve within the cylinder and valve-box, and the leathern valve at the bottom of the valve-plate which works within the soil-box; also the inverted conical-shaped leather cylinder top and metallic plates attached to the bottom thereof, and the method of working the same.

JAMES FILT, sen., of Wilmer Gardens, Hoxton Old Town, Middlesex, manufacturer, for *a novel construction of machinery for communicating mechanical power*, April 7.—Claim first.—The general arrangement of the several machines described.

Claim second.—The combination of a lever and pendulum, or levers and pendulums, vibrating upon one and the same fulcrum, centre, or axis, combining thereby the power of gravity and motion, and the mechanical action of the lever giving out the power communicated to the levers and pendulums, by means of the sector or sectors, or any modification thereof, thence by means of the compound or auxiliary lever or levers to a crank-shaft, or its substitute, where rotary motion is required, or from the auxiliary levers direct to the machine or apparatus, where reciprocating action is wanted.

The first part of this invention consists in an apparatus for communicating power. The power is applied to the power end of what are called the first or main levers, of which there are two, one at each end of the machine; their other ends are fastened to suitable fulcra or axes, from each of which a pendulum is suspended. To each of these axes is likewise attached a sector having a chain at each end, and these chains, after passing over two pulleys, placed above and below the axes of the main-levers, are fastened to one end of a second or auxiliary lever. There are two auxiliary levers, and their other ends are attached by connecting rods to two cranks, which transmit motion to the main-shaft by means of a cog-wheel; or in place of the crank-shaft, a plain horizontal shaft may be used, and actuated by eccentrics.

The patentee likewise shows what he calls single machines, similar in construction to the above, which is a double one, but actuated by only one main lever.

Claim third.—The arrangement for the purpose of communicating a reciprocating from a rotary motion.

The second part of this invention consists of a mode of communicating a reciprocating action to the main lever from a rotary one.

To the centre of the main lever, one end of a bar is fastened by means of a pivot, the other end works to and fro in a slot in the power end of the main-lever, and is attached by means of a chain to another bar, mounted on an axis to which a rotary motion is given; this last bar as it revolves carries the other with it, and so alternately elevates and depresses the power end of the main-lever.

ENTERED AT THE PETTY BAG OFFICE.

(Continued from page 199.)

THOMAS SPENCER, of Liverpool, carver and gilder, and JOHN WILSON, of Liverpool, lecturer on chemistry, *for certain improvements in the process of engraving on metals by means of voltaic electricity*, April 7.—Claim.—The use or application of voltaic electricity for the purpose of engraving metallic surfaces generally.

When the metallic surface to be engraved is copper, it is first covered with a coating of varnish or other protecting substance (the composition commonly known as etching ground is preferred), the drawing or design is then made with a pointed instrument, care being taken that the metal is fully exposed where the lines are required. The surface is now put in connection with the negative end of a voltaic apparatus, by means of a wire or slip of metal, and then placed in a vessel containing a solution of sulphate of copper. Another copper-plate or piece of copper-wire is in like manner made to communicate with the positive end of the voltaic apparatus, and is then placed in the same vessel with the plate to be engraved.

The circle being thus completed, the electric current will bite out the metal from those parts which are not covered by the varnish or etching ground, the depth and width of the lines being regulated by the distance of the two plates from each other, and also by the quantity and intensity of the electricity employed, and the time allowed for action.

When the surface to be engraved is in the form of a cylinder it is placed within a hollow cylindrical piece of metal.

When the surface to be engraved is steel, the vessel contains a solution of common salt, or other alkaline, earthy or metallic salts, and a steel-plate or piece of steel wire is used instead of the copper-wire.

When the surface is silver, a piece of silver wire or a silver plate is used, and the vessel contains a solution of sulphate of soda, or sulphate of silver.

When the surface is gold, a gold-plate or a piece of gold wire is employed, with a solution of hydrochloric acid, or a soluble chloride.

The other metals can all be engraved by the above process.

JOHN DAVIES, agent to Messrs. Newton and Berry, Manchester, civil engineer, *for certain improvements in machinery or apparatus for weaving* (being a communication), April 7.—Claim first.—The herein-described arrangement and combination of mechanism or apparatus, consisting of a self-acting temple, as applied to looms for the purpose of retaining fabrics at a uniform width during the process of weaving.

Claim second.—The application of a toothed wheel, in the position sustained and adjusted as herein described, together with the projecting pieces on the wheel-plate, over which the selvage edge of the cloth is turned, so as to enable the teeth or points to lay hold of the selvage of the cloth; and further the mode of adjusting obliquely or angling the temple by means of the adjusting bolts, and the mode of securing the wheel-plate in its position in the slide-plate of sheet-iron, together with the manner of securing the pins or points in the wheel, by subjecting the flange of the wheel to pressure.

Two "fixtures" are attached to the breast-beam of the loom, having a slot in each of them, within which a screw traverses; at the inner end of this screw is a projecting piece of metal, and to this is attached a slide-plate of sheet-iron by two adjusting bolts, by which the slide-plate can be set to any angle. The edges of the slide-plate are bent in order to hold the wheel-plate and wheel, which wheel is pierced all round for the admission of teeth, which are secured in their places by placing the wheel in a steel die, and subjecting the flange of the wheel to pressure, in order that the metal being rendered more compact may retain the teeth. The cloth passes, first over a projection on the wheel-plate, then round the wheel, and out at an opening in the wheel-plate to the cloth beam. The temples may be made to approach or recede from each other by means of the screws first mentioned, according to the width of the cloth.

The patentee shows a modification of the above temple, which consists of a slight difference in the wheel-plate.

Claim third.—The combination or arrangement of the segment temple, with the small roller covered with card teeth.

The segment temples are connected to the breast-beam by springs, their distance from the same being regulated by expansion screws. This temple consists of a plate containing two rollers, over which a toothed segment travels; one of these rollers turns on a stud, but the other is fastened on an axis, which extends from one temple to the other, having on its centre a small roller covered with card teeth, which are in contact with the centre of the cloth, so that on the cloth proceeding to the cloth-beam it turns the axis. The selvages of the cloth are caught hold of by the toothed segments, which travel in a curved direction in order to sketch the same.

Claim fourth.—The following arrangement of machinery, and the adaptation of a spring reed, from which (says the patentee) I am enabled to obtain a "taking up" motion as applied to weaving machinery.

Against the back of the reed the upper end of a lever presses, which has for its centre of motion a stud that projects from the lathe-sword, being kept in contact with the reed by a spring; the lower end of the lever is occasionally brought in contact with a stud upon a horizontal shaft at the bottom of the loom, which is capable of vibrating backwards and forwards in suitable bearings. One end of this shaft is provided with a spring latch, which takes into the teeth of a ratchet-wheel placed at the foot of a vertical shaft, at the top of which is a worm, that drives a wheel at the end of the cloth-beam; at the other end of the horizontal shaft is a stud, which is acted upon by an elbow lever worked by a cam. When the reed has struck the weft it falls back a little upon its hinges, and so causes the lever to move the horizontal shaft towards the ratchet-wheel, by which means the spring latch is made to take into another tooth of the ratchet-wheel further round than the previous one; the cam then causes the elbow lever to move the horizontal shaft back in the reverse direction by means of the stud, by which last movement the vertical shaft is turned partly round, and by means of its worm the cloth-beam is also turned a little, in order to take up the cloth.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 19th of June.

Alexander Horatio Simpson, of New Palace-yard, Westminster, gent., for *an improved machine or apparatus for working pumps* (being a communication), due June 9.

William Peirce, of George-street, Adelphi, gent., for *improvements in the preparation of wool, both in the raw and manufactured state, by means of which the quality will be considerably improved*, due June 9.

RECENT AMERICAN PATENTS.

Improvement in the mode of supplying Steam Boilers with Water, by Benjamin M. Hyatt, Wilmington, Oct. 10, 1840.

Improvement in the manner of propelling Boats upon Canals, or other shoal water, by the agency of Steam, by Mellen Battel, Albany, N. Y., Oct. 14.

Improvement in Cooking Stoves for burning Bituminous Coal, &c., consisting of a mode of cleaning the Flues surrounding the ovens of the same, &c., by Wm. B. Lawrence, Cincinnati, O., Oct. 14.

Improvement in Spark Arresters, by Randal Fish, New York, Oct. 14.

Improvement in the manner of constructing Wheels for Railroad Cars, by Albert Fuller, Providence, R. I., Oct. 14.

Improvement in Vegetable Cutters, by George J. Neveil, Rising Sun, Pa., Oct. 14.

Improvement in Cooking Stoves, by James Parmele Ogden, N. Y., Oct. 14.

Improvement in the Ever-Pointed Pencil-case, by Thos. Woodward, Brooklyn, N. Y., Oct. 14.

Improvement in Boilers for heating Water for culinary and other purposes, by Daniel L. Pickard, Hartland, N. Y., Oct. 14.

Improvement in Cooking Stoves, by Samuel L. Chase, Woodstock, Vt., Sept. 25.

Improvement in Crosing and Chiming Staves, by Chas. F. Berverly, Salem, Columbiana co., O., Oct. 16.

Improvement in the mode of supplying water to Buildings for the purpose of extinguishing Fires, by Isaac Lowell, Niagara, N. Y., Oct. 16.

Improvement in Planting Machines, by Martin Nichols, Clearfield, Pa., Oct. 16.

Improvement in Re-action Water Wheels, by Archibald Bryce, Campbelltown, N. Y., Oct. 16.

Improvement in the mode of hauling off Stranded Vessels, by Thomas Bell, Bellport, N. Y., Oct. 22.

Improvement in the method of shifting Switches on Railroads, by Richard W. Sheckells, Baltimore Md., Oct. 22.

Improvement in the manner of constructing Machines for knitting Stockings, by Benj. Hutchinson, Springfield, Mass., Oct. 22.

Improvement in the Alarm to protect Houses against Thieves, &c., by Lester E. Deninson, Saybrook, Ct., Oct. 22.

Improvement in the Machine for hewing Plough-beams, Carriage-shafts, Cross-bars, and other Timbers, by Eldridge G. Mathews, Worcester, Mass., Oct. 22.

Machine for planing and forming Ivory and other Comb Plates, by assignees of Wm. M. Fowler, North Branford, New Haven co., Ct., Oct. 28.

Improvements in the Rotary Temple for Weaving Looms, by George Draper, Palmer, Mass., Oct. 28.

Improvement in the Machine for Cleaning Wool from Burs and other foreign matter, and also for ginning Cotton, by Milton D. Whipple, East Douglass, Mass., Oct. 28.

Improvement in the Machine for cutting Shingles, by Miles R. Payne, Anaersontown, Ia., Oct. 30.

Improvement in the manufacture of Gaiter Boots by the introduction of Gum-Elastic Gores, by John H. Dupont and Theodore Hyatt, N. Y., Oct. 30.

Improvement in the Machine for cutting Corks, by Charles R. Macy, Hyde Park, N. Y., Oct. 31.

Improvement in the mode of clearing Snow from Railroads, by Joseph H. Moore, Worcester, and Benjamin Woodworth, Boston, Mass., Oct. 31.

Improvement in the mode of preparing Tallow for the manufacture of Candles, by John Kirkman, N. Y., Oct. 31.

Improvement in Machines for separating Garlic from Wheat, by Jonathan F. Barret, North Granville, N. Y.. Oct. 31.

Improvement in the mode of protecting Trees from the Canker Worm, by Daniel Newhall, Lynn, Mass., Oct. 31.

Improvement in the mode of constructing, and the mode of combining, Portable Ovens with Stoves, by Edward Gosselin, New York, Nov. 7.

Improvement in the manufacture of Trunks, for rendering them Water-proof, by Peter Getz, Lancaster, Pa., Nov. 7.

Improvement in the mode of cooling "the Mash used in the Process of Distillation, &c.," by Allen D. Ward, Minerva, Mason co., Ky., Nov. 7.

Improvement in Printing Presses, by Stephen P. Ruggles, Boston, Mass., Nov. 10.

Improvement in the manner of constructing and shifting the Switches used at Turn-outs on Railroads, by Jesse La Rue, Bristol, Pa., Nov. 10.

Improvement in the Machine for Cutting Nails, Brads, &c., by Geo. D. Strong and Jonathan Dodge, assignees of Walter Hunt, New York city, Nov. 13.

Improvement in the Door Spring, by Wm. W. Smith and Benjamin Mulliken, Jr., New York city, Nov. 13.

Improvement in the Machine for Manufacturing Balls or Shot, by Levi Magers, Baltimore, Md., Nov. 13.

Improvement in the Windlass Bedstead, by Thomas Lamb, Washington City, D. C., Nov. 13.

Machine for Sawing Paving Blocks of Wood, by Amaziah Nash, Calais, Washington co., Me, Nov. 13.

Improvement in Churns, by Constant Webb, Wallingford, Conn., Nov. 26.

Improvement in Musical Instruments, entitled the Vocal Organ, by John W. Campbell, Attica, Indiana, Nov. 26.

Improvement in Cooking Stoves, by David H. Hilliard, Cornish, N. H., Nov. 26.

Improvement in Spark Extinguishers, by David Ritter, New Haven, Conn., Nov. 26.

Improvements in Rotary Steam Engines, by Jacob C. Robie, Binghampton, N. Y, Nov. 26.

Improvements in Machinery for Straining and Preserving Clothes-Lines, by Edwin Allyn and C. B. Hildreth, Boston, Mass., Nov. 26.

Improved method of removing Straw, and separating the Grain, in Threshing Machines, by John Criswell, Cecil, Pa., Nov. 26.

Improvements in the construction of Ships' Cabooses and other Cooking Stoves, by Loftis Wood, New York, Nov. 26.

Improvement in the construction of Portable Furnaces for Heating the Water in Bathing Tubs, by Randolph Densmore, Hopewell, N. Y., Nov. 26.

Improvement in the manufacture of Splints or

Sticks for friction Matches and other articles, by Norman T. Winnans and Thaddeus Hyatt, N. Y., Nov. 26.

Improvement in the mode of regulating the Waste Steam in Locomotive Steam Engines, by Ross Winans, Baltimore, Md., Nov. 26.

Improvement in apparatus for sinking Wells in alluvial soils, by Ebenezer Rice, Salina, N. Y., Nov. 26.

Improvement in the "Cut off" Valves of Steam Engines, by Wm. A. Lightball, N. Y., Nov. 26.

Improvement in the Machine for Skeining Silk, by George Heritage, Chestertown, Md., Nov. 26.

Improvement in the manner of forming oblique catches, protuberances, and dove-tailed fastenings, on plates and other pieces of cast-iron, &c., by Jordan L. Mott, N. Y., Dec. 1.

Improvement in the mode of constructing a Combined Caldron and Furnace for the use of Agriculturists and others, by Jordan L. Mott, N. Y., Dec. 1.

Improvement in the mode of Heating Buildings by means of an apparatus consisting of Tubes for the generation of hot water, arranged in an air chamber, adapted to the same, by Geo. M. Dexter, Boston, Mass., Dec. 1.

Improvement in Sleds for the Transportation of Ice in Blocks, by Nathaniel J. Wyeth, Cambridge, Mass., Dec. 1.

Improvement in the machine for Cutting Ice, by Nathaniel J. Wyeth, Cambridge, Mass , Dec. 1.

Improvements in the machinery for Raising Blocks of Ice from the water, and depositing the same on to sleds, by Nathaniel J. Wyeth, Cambridge, Mass , Dec. 1.

Improvements in machinery for reducing Blocks of Ice to a uniform thickness, and cutting parallel ridges on the upper surface of the same, by Nathaniel J. Wyeth, Cambridge, Mass., Dec. 1.

FOREIGN INTELLIGENCE.

FRANCE.

THE PARIS TELEGRAPHS.

There are in Paris five telegraphs, viz., the central telegraph in the Rue de l'Université, which is about to be transferred to the Ministry of the Interior; the telegraph at the Ministry of Marine, which corresponds with the line of Brest; the telegraph on the church of St. Eustache, for the line of Lille; and the two upon the towers of St. Sulpice, one of which (the north) corresponds with the line of Strasburg, and the other (the south) with Lyons and Italy. At the central station accounts are received from Calais in three minutes, by a line of 27 telegraphs; from Lille in two minutes, by 22 telegraphs; from Strasburg in six minutes, by 46 telegraphs; from Lyons in eight minutes, by 50 telegraphs; and from Brest in eight minutes, by 80 telegraphs.

POWER OF DIRECTING BALLOONS.

We take the following account from the *Moniteur Parisien.* If the statement be correct it appears that the great object so long desiderated of guiding balloons has been attained; but as no particulars are given of the mechanism employed we suspect there is much exaggeration in the account:—"An experiment of the highest interest was performed on Monday at the Chateau de Villetaneuse, near Saint Denis. M. S. and his son had for some time past announced publicly that they had succeeded in the means of directing balloons in the air, and several experiments on a small scale in the court-yard of the Ecole Militaire, in Paris, had been attended with satisfactory results. The experiment of Monday has verified all their hopes. M. S., jun. after rising to a height of about 250 metres with a balloon constructed by himself and his father, set at work their ingenious mechanism, and immediately the balloon proceeded to the west, notwithstanding a pretty strong wind blowing from that point. He then returned, and sailed about in various directions, the balloon rising or lowering at the will of the aeronaut, without the apparent use of any kind of ballast. The experiments lasted for three hours, at the expiration of which time M. S. descended at the point from which he had started, amidst the acclamations of the spectators."

From the Port Royal to Port Louis, along the quays, a double line of lamps is placed for lighting with gas. A similar row is about to be placed on the side of the quay from the Tuileries. Footpaths of asphalte are going to be laid down on each side of the banks of these quays. The Rue du Faubourg, Poissonnière, will also be lighted with gas next month.

The waters which have continued to flow without ceasing from the Artesian well, at the abattoir of Grenelle, are subject to great changes in their purity, and the *savans* are paying great attention to this subject. On Saturday at noon, these waters were almost as clear as the waters of the Seine; the day before on the contrary, according to the account of M. Mulot himself, the water was almost as black as that of the sewers.

BELGIUM.

During the month of March, 70 vessels entered the port of Antwerp, and 79 left it; 71 of which were freighted, and 8 contained ballast. Of these vessels, 17 of those entered were Belgian; and of those that sailed from the port 23, freighted, and 4 containing ballast.—During the first three months of 1841, 166 vessels entered Antwerp, 45 of which were Belgian. During the first three months of 1840, there entered about 158 vessels, of which 52 were Belgian.

The question of a change in the ministry has been lately much agitated in Belgium. These are matters, however, in which we do not interfere, further than as they affect the manufacturing and trading interests. Among the members of the new cabinet, which is announced by the *Moniteur Belge*, we observe that M. Nothomb, who took an active part in the formation of the railway system of Belgium, is appointed Minister of the Interior; and M. Desmaisieres the Minister of Public Works.

The Minister of Public Works has been giving names to many of the locomotives employed on the Belgian railroads which have hitherto not been specially denominated. The number thus named amounts to nineteen, and among the names chosen by the Minister are those of "Leopold 1st," "the Queen Louisa," "the Duke of Brabant," "L'Avenir," and "La Loi du premier Mai, 1834."

Some new paintings have been received in the cathedral of Cologne, representing angels of a collossal size painted on a gold ground. They are supposed to have been painted by Guillaume de Herl, or his pupils.

RAILWAY INTELLIGENCE, DOMESTIC AND FOREIGN.

Bristol and Exeter Railway.—We have been informed, on good authority, that the line from Bristol to Bridgewater will be ready to open for traffic on Whit Monday, the 31st of May.—*Bristol Standard.*

Works on the Eastern Counties Railway.—We are informed by an eye-witness that the most energetic exertions are now made to hasten the completion of the Eastern Counties Railway to Colchester. About 400 men are employed on the line at Chelmsford, and that number is to be soon doubled. In the course of the coming summer, it is expected operations will be commenced in every part of the line. On the 7th inst., the first stone of the new bridge, over the river Chelmer, in the parish of Springfield, about to be erected to connect the embankment of the Eastern Counties line, which has been some time in the course of formation, and which is now traversed by means of a wooden viaduct, was laid by Mrs. Braithwaite, the lady of John Braithwaite, Esq , the engineer in-chief to the company.—*Essex Standard.*

On Saturday last, trial was made on the London and Birmingham Railway, in presence of Sir Frederic Smith, of two plans for accomplishing the grand object of efficient railway signals. The first was that of Mr. Pettitt, for effecting a communication between the guard and engine driver:—the other a contrivance to enable a policeman on the line to open a whistle on the engine by fixing a catch upon the chairs which support the rails, and thus give notice to the driver in a fog, or under other circumstances, should any thing be wrong a-head. We understand that both plans proved highly satisfactory.—*Railway Times.*

Railroads for Ireland.—At length this subject is taken up in good earnest; a number of English capitalists have come forward with necessary funds, and they are to be secured by the Government at a certain per-centage on their outlay. We understand that the Messrs. Baring stand at the head of the list.—*Waterford Chronicle.*

Mr. W. S. O'Brien has given notice that he will, on the 29th inst., move that "the house will resolve itself into a committee of the whole house, for the purpose of considering an address to her Majesty, praying that she will be graciously pleased to recommend to Parliament that provision may be made for carrying into effect the suggestions contained in the Second Report of the Commissioners appointed to consider and recommend a general system of Railways in Ireland, subject to such extension or modification as may appear desirable to her Majesty's advisers and to Parliament."

The Railways Bill.—Mr. Hume has given notice that he will, in the committee upon the Railways Bill, make it "compulsory on the directors of all railroads on which mails are conveyed on the week days, to carry them on Sundays also, at the same charge on Sundays as on week days."

Forcing Entrance into a Railway Carriage.—A person named James Harding was charged at Union Hall police-office last week, with having climbed over the gate at the railway station at Wandsworth, after the train arrived, and with having taken his place in one of the carriages without a ticket. The defendant, it appeared, was willing to pay his fare, but having been detained, had come too late, and the gates were closed. His sisters had taken their places in the train, and as he was anxious to accompany them to London, he climbed the gate and entered the carriage. He offered to pay the guard the fare, but it was refused. He was fined ten shillings and costs.

RAILWAY ACCIDENTS.

Accident on the Blackwall Railway.—A guard of one of the trains on the Blackwall Railway, foolishly jumped off the carriage on Wednesday evening before the train stopped at Poplar, and, having missed his footing, he fell with his right foot across one of the rails. Three wheels of the carriages passed over it, and his toes were so severely crushed, that the foot was obliged to be amputated above the ancle.

Explosion of a Boiler.—An accident, which has been attended with fatal results to a most valued servant of the company, occurred at the Bromsgrove station on the Birmingham and Gloucester line, on Tuesday se'nnight last. It appears that whilst the steam of one of the engines used in drawing the trains up the inclined plane at the Lickey was being "got up," a plug from the boiler was blown out; the consequence was a sudden rush of the water and steam from the boiler, and the fire door being open all those on the platform of the engine, or on the tender, were more or less scalded. These were Mr. Creuze, the engineer of the locomotive; Walworth, his foreman; Mr. Torry, a foreman of Messrs. Nasmyth and Co.; the stoker,

and Mrs. Walworth. Mr. Creuze, we lament to say, was so dreadfully injured that, after lingering in much agony till Thursday morning, he expired. Walworth and the stoker, with Mrs. Walworth, were severely scalded, but it is hoped they will do well, whilst Torry escaped comparatively unhurt. There have been one or two other casualties on the line during the week, but happily of no such serious nature as the foregoing. Tuesday morning at no great distance fron Spetchley, the lading of one of the luggage wagons was ignited by the sparks from the engine furnace, and goods to some amount destroyed before the fire could be extinguished; and the following night the second up-mail train was delayed an hour and a half at Defford in consequence of one of tho boiler tubes of the engine bursting.—*Worcester Herald.*—An inquest was held on the body of Mr. Creuze on Friday. The principal evidence was that of Carter the stoker. The engine was one of the American engines employed on the Gloucester Railway, and it had been lately repaired. He said the pressure of the steam had been 48lb. to the square inch, but that Walworth lifted up the balance and allowed it to escape just before the accident. The jury returned a verdict of accidental death, with a deodand of £25 on the engine.

Accident on the Eastern Counties Railway.—On Sunday evening about 25 minutes before 8 o'clock, the Romford train, on its way to London, arrived at the station in Devonshire-street, Mile-end, when a passenger named Lovell, who had been riding in one of the third-class carriages, alighted, and was stepping across a platform, when, owing to the greasy state of the platform, from the rain which fell in the afternoon, he suddenly slipped and fell backwards on the rails. At this instant a policeman called out "all right," and the train started, and a violent shriek was immediately afterwards heard, and it was then found that the engine and carriages had passed over the unfortunate man. He was conveyed to the London Hospital, Mile-end-road, where it was ascertained that his left leg was crushed and the foot of his other leg severely jammed. It was deemed expedient to amputate the left limb, and that operation was immediately carried into effect.

A Guard Killed from Carelessness.—Thursday se'nnight, while the train which left Greenock at half-past four was proceeding to Glasgow, one of the guards, named Barclay, was folding up a tarpauling upon one of the carriages, when his head came in contact with the arch of a bridge on the Glasgow side of the Arkleston tunnel, and from the velocity at which the train moved, he was killed on the spot. The deceased was quite a young man, had only been a few days on the line, and is a native of Ballochmyle.—*Scotch Reformers' Gazette.*

FOREIGN RAILWAYS.

The Great Tunnel through the Papau ridge, on the line of the Chesepeake and Ohio Canal, is probably the greatest work of the kind in this country. It is now so far completed that the light can be seen through it, the laborers penetrating from each end of it having met in the centre. The length of the tunnel is 3,118 feet—from the top of the arch to the surface of the ground above, is, at the highest point, 328 feet. It is to be 24 feet in diameter, most of which will be above the water surface.—*American paper.*

Railroads in Cuba.—Railroads are in progress and projected to nearly every part of the island. One from Cardenas to Cimmarones, fourteen miles, is completed. The road from Neuvitas to Puerto Principe has materials for the whole distance collected, and nine miles nearly finished.

Performance of an American Locomotive.—On the 9th ult. the *Hichens and Harrison* engine hau'ed over the Philadelphia and Reading Railroad (51½ miles in length from Reading to its intersection with the Columbia Railroad) a net burden of 308½ tons of 2,240 lbs., in 105 cars, weighing 173 tons—making a total gross weight of 481½ tons; weight of engine, with water and fuel, 26,700 lbs.; cars, four-wheeled; and running time 4 hours 54 min.; the whole length of train 1,260 feet. The engine started the above train, on a level, without any assistance, and gradually increased her speed to the average of 11 miles and one-tenth per hour. The above performance is believed to be unsurpassed, and the train to be the longest and heaviest ever hauled by one engine on any railroad in Great Britain or America.—*Correspondent of the Mining Journal.*

Extension of Railroads in Germany.—It may be said that public interest is concentrated in the construction of railroads. New branches will soon be extended through a great part of Germany. Measures are adopted for hastening works which will promote more direct communication among the various nations who inhabit the ancient land of Germany. Hanover in turn gives her assistance to the undertaking. On the proposal of the Minister of the Interior, the King of Hanover has given his sanction to the construction of railways that shall have the town of Hanover for their common centre, and the first line from thence will be towards Brunswick, by Celle and Hildersheim. The second in the direction of Hamburgh and Boitzemburgh; and the third as far as Minden in Prussia. The portion of this road from Hanover towards Hamburgh, is intended to join another railroad which will be established from Wiesmar to Luneburgh. As to the branch which will connect a part of Prussia with Hanover, it may be considered as a portion of the great railroad which is intended to connect the Rhine, near Cologne, beyond Magdeburgh, with Berlin, as well as with Leipsic, Dresden, &c. The governments of Prussia, Hanover, and Brunswick have commenced negotiations relative to the road from Minden to Madgeburgh, by Hanover and Brunswick, the satisfactory results of which will soon be made public. The *Gazette du Hanovre* informs us that while waiting the termination of the negotiations which have been undertaken by the commissioners appointed for that purpose, the preparatory works are vigorously carried on along the whole extent of line which leads from Hanover to Minden, and that the government of Shaumburgh-Lippe has already given permission that the Hanoverian railroad may be carried through its territory. Extensive projects for establishing railroads in Upper Austria are spoken of. Thus the re-action is everywhere at work. With respect to the plan of a railroad from Lille to the sea, it would already have been commenced had there not been a clashing of interests.

ON THE PREVENTION OF CHIMNEYS FROM SMOKING.

It is known that the draught of chimneys depends on three principal causes:—on the height of the chimney, on its diameter, and on the temperature of the air. It is easy to make calculations with respect to the erection of the chimneys of manufactories, for they always consume the same quantity of fuel in a given time, and consequently the temperature is nearly equal; while in the chimneys of houses it is not possible to form similar conclusions, or to make the same calculations. The temperaturo of the smoke in the chimney varies according to the kind of stove that is used; the quantity of fuel consumed is also uncertain. Hence it results that the draught cannot always be the same, and the state of the atmosphere will consequently have more influence on it. Thereforo in the chimneys of houses no attempts should be made to increase the draught, either by the height or the diameter of the chimney, nor by changing tho temperature of the smoke inside.

What then will be the most efficacious means of producing a good draught with reference to the different states of the atmosphere? that is, to fogs, winds, rain, and a sudden diminution of temperature, which are tho principal causes of smoke coming down the chimney into rooms, even into those rooms where the chimneys are well built. The first thing necessary to be attended to is to cover the chimneys; and for this purpose different contrivances have been adopted and placed on the tops which shelter them from the wind and rain; but these do not answer all the purposes, for the great object is to increase the draught, not to lessen it.

It is known that smoke ascends by the property which gases possess of ascending when their temperature is higher than that of atmospheric air; but the trifling difference of temperature that exists between the smoke in the chimneys of houses and the atmospheric air is frequently insufficient to overcome the resistance that all these causes oppose to it. Consequently some method should be adopted of causing the smoke to ascend so as to disperse it afterwards from the chimney into the atmosphere, in order to prevent its being driven back into the room.

We have seen the apparatus of Mdde. Rottermund intended to produce this effect; it is simple and not at all expensive. It is composed of a mitred weathercock, containing two ventilators on the same pipe; the upper one, which receives the wind through an oblique opening, opens on the lower ventilator, which causes the smoke to ascend the chimney, and forces it outside by means of a large opening made in that part of the mitre which is in a direction opposite to the wind. Thus the draught is increased proportionately to the strength of the wind; but when the weather is calm it does not act.

It is well known that there is great friction on the pivots of this machine, but we do not doubt that if the manufacture and placing of these was to be taken up by some active establishment, that our country would soon be delivered from one of the three scourges of a house, a drunken man, a scolding wife, and a smoky chimney.—*Moniteur Industriel.*

TO CORRESPONDENTS.

We were prevented from seeing MR. HAM'S *letter, until it was too late to give it consideration. It shall, however, appear next week.*

We shall be glad to hear further from our correspondent at Stoke-Devonport, and to be put in possession of the facts to which he alludes.

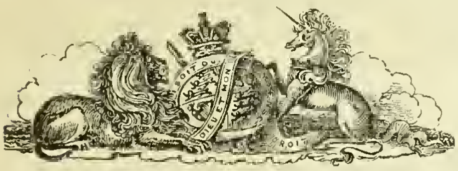
We fear the claims of the Russian gentleman to compensation as the inventor of wood paving has a poor chance of being considered. There are already several patents obtained for the application of the principle. Government only comes forward to remunerate inventors in cases where the claims are forced on their notice.

MR. J. PARKES'S *publication on railways, and other works received, will be noticed next week.*

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of to-day.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 23 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes, containing the Nos. of every 6 months.



THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, APRIL 17, 1841.

In our recent observations on the injustice and impolicy of the patent laws, we alluded to the fact that no description of an invention is required before the patent is granted, nor until six months afterwards. Some circumstances have since come before our notice, which induce us to revert to this point, for the purpose of showing more fully the injurious tendency of those undefined exclusive privileges which are now conferred by a patent.

In the present state of the law in this country, a person who has invented *nothing* may take out a speculative patent for an invention which he hopes to filch from some one before the time arrives when he is required to specify and declare the nature of his invention. Or, a person having a notion of some improvement, for which he wishes to obtain a patent, may, within six months after the patent is sealed, discover some error in his own plan, and find that some more ingenious mind has contrived a superior method of obtaining the same end. He is thus enabled to adopt the suggestions of the other as his own, and deprive that party, not only of the merit, but of the profit of the invention.

All that is at present required by the government law-officers before granting a patent is, that the party making the application should give his invention a title, and that he should *pay the fees.* Now it is impossible in most cases to define from the title of a patent what is the nature of the invention for which exclusive privileges are claimed. Who, for instance, could ascertain from knowing that patents had been granted for "improvements in steam-boilers,"—for "a new motive power," for "improvements in ship-building," &c., &c., what was the nature of the invention until the specification was enrolled? In the meantime a person who has obtained such a patent, may employ emissaries to pry into the experiments which he suspects are making by rival manufacturers, and if successful in obtaining possession of their secrets, he may embody their plan with his own, or supersede his altogether in favour of the one he has thus purloined. The unspecified patentee may thus become a general marauder, and as there is no evidence to prove that the plan to which he afterwards lays claim does not form part of his original invention, he is enabled not only to deprive another of the fruits of his ingenuity and labor, but to prevent the original inventor from bringing his invention into competition with the licensed pirate.

This state of the law offers great facility for fraud, which we believe is not unfrequently practised; but independently of this consideration it is attended with serious inconvenience to inventors. It very often happens, for instance, that an improvement on some common process, or a new application of machinery, has been suggested and brought to perfection, but the inventor finds that some other person has obtained a patent from the title of which he suspects it may be the same as his own. He is prevented therefore from proceeding to protect his own invention, or from taking any further steps in its improvement, until the expiration of the time when the patentee is required to describe his invention. The law officers of the Crown would indeed be ready enough to receive the fees for the new patent, whether it were for the same invention as the preceding patent or not, but the inventor might afterwards find that he had paid for a privilege which had been previously exclusively granted to another. *The fees would not be returned*, as in justice and honor they ought to be, and as in other countries they are, and the luckless inventor has no redress, because the robbery has been effected according to precedent and with legal formality.

It is one of the features of the fee system never to return money, whether any service be rendered for it or not; and so the party who is seduced into taking out a patent which proves to be invalid, by the claims of some one who has preceded him, must submit quietly to his loss.

If every applicant for a patent were compelled in the first instance to state in writing the principle of his invention, a great part of the inconvenience and injury arising from the unlimited scope given in subsequently making out claims would be remedied. We should not wish an inventor to be bound to state the mode of manufacture, but he ought at least to mention the principle on which it depends. This is required from him in case any application for a patent of similar title be made *before his patent is sealed;* but when he has obtained the Lord Chancellor's seal, he is allowed, without any subsequent questioning, to prefer any claim he pleases so that it have some reference to the title for which the patent is granted. As an amendment in the law to this effect might be made without affecting official fees, there is some hope that this modicum of reform at least might be obtained in the patent laws, provided the subject were taken up by some influential member of Parliament. Mr. Emerson Tennent, who has so ably advocated the cause of one class of inventors, will, we trust, be induced to extend his regards to the more useful and worse-treated inventors of machinery, with a view at all events to obtain such improvements in the law as may be made without affecting existing interests.

NEW INVENTIONS.

NEW FURNACE FOR STEAM-ENGINE BOILERS.

We have this week seen a new plan of setting steam boilers, invented by Mr. Apsey, engineer, which promises to be the means of saving a large quantity of fuel, by exposing a much larger heating surface than can be effected by the usual arrangement of steam-boiler furnaces. It is now the practice to confine the action of the heat to that part of the boiler below the water line, to prevent the boiler from being burnt by the fire on those parts where there is only steam, as would certainly be the case if the flame were allowed to touch it. Either the boiler is bricked over in the upper part, or it is covered with felt to keep in the heat, as no attempt is made to render the upper portion of the boiler part of the heating surface. Mr. Apsey's method combines the advantages of gaining an increased heating surface without incurring the danger of burning the metal. The plan he proceeds on is this:—He makes the boiler rest lengthways on a ridge of brickwork, and he builds up the furnace with a space between the bricks and the boiler to the top, where another ridge of brickwork runs along. The fire is placed at the end of one of these divisions formed under the boiler, and the chimney for the draught is at the end of the other division. The flame thus runs the length of one half the boiler, and passes down the other half to the chimney. In order, however, to prevent the flame from touching the upper portion of the boiler, which would otherwise be exposed to it, the farthest end of the furnace is bricked up below the water line. It is in this contrivance that the chief merit of Mr. Apsey's invention consists; for as the draught at the two ends is confined below the water line, the flame will not rise higher than that point during its draught along the flue. The upper part is thus filled with heated air, which keeps up the temperature of the steam without injuring the boiler. Against this advantage is the set-off that no fire acts on the centre of the boiler; but this may be remedied by subtituting an iron partition for a brick one. The saving of fuel by this plan has been tested in several boilers to which it has been applied; amounting, it is estimated, to twenty-five per cent. Mr. Apsey has a high pressure steam-engine of twelve-horse power, working the machinery in his factory in Roupel-street, Waterloo-road, which has been performing on his principle

most satisfactorily for some months. The boiler in this instance is only two feet three inches diameter, and thirty feet long; but the plan is applicable to boilers of all dimensions.

NEW GAS REGULATOR.

M. Osmond presented to the French Academy a gas regulator, the principle of which consists in regulating the consumption of gas without making use of water, which has been hitherto employed by the gas companies. This regulator saves the consumers of gas the trouble of keeping the gas in the burners always at the same height. It is known, that at certain times, when, for example, a great number of burners are extinguished, the gas rushes with force towards those which are still lighted, and occasions a very powerful blaze, and also a waste of gas, which diffuses a disagreeable smell. This regulator consists in a small jet of gas exposed to the variations of pressure, burning in a metallic tube. The dilation of the tube indicated by a higher degree of pressure, closes by means of a lever, a conical stop-cock, which diminishes the passage of the gas, and prevents the increase of flame in the burners. If the pressure is diminished, the small burner does not convey so much heat to the tube, which becomes contracted, lowers the conical stop-cock, and admits a wider opening for the passage of the gas. Thus the advantages derived by the consumer in using this instrument are the following:—The light is always the same; the injury to the ceiling is considerably less, and consequently there will be less inconvenience attending the use of gas in warehouses containing fancy articles, &c.

NEW TYPE FOUNDING MACHINE.

A letter from Boston (United States) gives the following notice of a new machine for casting types:—"A machine has been invented and built by Mr. Peter Sturtevant and Mr. Edward Starr, the head mechanics of the Boston Type and Stereotype Foundry, which is likely to be of very important use in the art of type-making. It is a machine for casting the type, by merely turning the crank, thereby avoiding the laborious and dilatory process of casting by hand. The operation of this machine may be performed by a boy, or a person entirely unskilled, with double the rapidity of the best caster; and so much greater is the force by which the metal is injected into the moulds than that exerted in casting in the usual method, that there is rarely, if ever, an imperfect face in casting the most slender and difficult letter. There is, besides, less waste of metal than in the ordinary mode of casting. The machine is not complex, and is little likely, as far as we can judge from its construction, to get out of order. We forbear giving a more particular description, because the ingenious inventors have not yet secured the benefit of their improvement by a patent. This we presume they will do without delay.

IMPROVED PLAN OF FILTERING.

A new plan of filtration has been invented upon a novel and grand scale, by the medium of which any quantity of dirty or discolored water may be rendered as bright as crystal at the rate of hundreds and thousands of gallons per day. In order to convey some notion of the rapid and certain effect of this newly-discovered system, the following experiments may be named. The sweepings of a dirty yard and the cleansing of a coal cellar were cast into one of these filters, and the water which flowed from it, at the rate of six gallons per minute, was as pure and clear as if it had been freshly drawn from a spring. One of these filters has been lately erected on board the Dreadnought vessel, lying off Greenwich. The filter supplies pure water for the whole of the patients on board the vessel. It acts in a double capacity, that of cistern as well as filter, for as fast as the water runs in it is drawn filtered. It only requires cleaning once every six months, which can be done in less than half an hour, without the inconvenience of the filter being taken away from the vessel. To ships going to sea this invention would be of the most beneficial advantage, as a filter of eight inches in diameter, occupying such a small space, would supply 2,000 gallons per day of pure water, and it could be cleaned by any common sailor with the assistance only of a kettle of boiling water. In addition to the above, this filter will purify oils, wines, and spirits, without their sustaining the least detriment in taste, quality, or color.

PROCESS FOR PRESERVING TIMBER AND CANVAS.

Sir W. Burnett has taken out a patent for a new mode of accomplishing the preservation of timber, canvas, cordage, and other articles used in the construction of houses, ships, &c., from the dry rot, mildew, and other effects of warmth combined with moisture, so destructive to substances of vegetable origin. This week Mr. Jackson visited Liverpool, with some of the more portable specimens illustrating the value of the process. The specimens we had an opportunity of seeing on Wednesday were principally drugget and canvas, of which pieces, prepared and unprepared, had been exposed to tests of different descriptions. We had an opportunity also of observing the process which renders wood altogether uninflammable and nearly incombustible. We do not know that it will make it particularly popular with the rope-makers; but Sir William Burnett recommends the disuse of tar for yarns, and produces strong evidence to show that white yarn prepared is $37\frac{1}{2}$ per cent. stronger than the like weight of hemp worked with tar in the usual way.—*Liverpool paper.*

NEW SYSTEM OF TRANSIT.

It is stated in the *Railway Times*, that Mr. H. Taylor, the inventor of the steam cooperage, and Mr. Conder, who has recently published a small work on railways, have invented a new system of communication by locomotives, which will comprise all the advantages derived from the present plan of railways at a greatly diminished cost. The new system has, it is said, been submitted to the severest tests, and that patents are about to be secured for this invention. The *Railway Times* says, that this improvement in transit "bids fair to effect an entire evolution in the railway system."

SPINNING MACHINE.

There has been lately invented at Dinan, in the Côtes du Nord, a spinning machine which combines the advantages of a hand and power loom. It is small in compass, extremely simple, and of low price. Two women may keep in motion 16 spindles, producing thread as strong and even as those of the best manufactories.

COMBINED ZINCING AND TINNING.

A patent has been granted in the United States to Messrs. Summer and Naylor, of New York, for an improvement in the process of tinning iron to prevent it from rusting, and also to obviate the inconvenience of zincing iron, which arises from its diminished malleability. The invention is an improvement on one for zincing iron for which a patent was granted, in 1837, to M. Sorel. In the specification of their invention the patentees state that having become proprietors by assignment of M. Sorel's patent process, in carrying the same into practical operation they found that the malleability of sheet-iron is much impaired by giving it a coating of zinc, in the manner directed by M. Sorel; and that, in consequence of this diminished malleability, such prepared sheet iron is unsuited, in many cases, to be applied to the purpose of covering the roofs of houses, or to be otherwise used where it is required to be grooved, seamed, or in any way suddenly bent. This improvement consists in a process by which this difficulty is obviated, whilst the zinc is at the same time so applied as by its galvanic action on the iron to protect it from oxidation. Their mode of proceeding is thus described:—"We take sheets of iron, and cover them with tin, or with an alloy of tin and lead, adopting in this process the mode or modes followed in the well-known manufacture of sheets or plates of iron into tin plate. After having completed this operation, we submit the sheets or plates so prepared to a like process, with the substitution of zinc for tin, or an alloy of tin; the mode of performing which does not differ from the ordinary process known under the name of tinning. When thus treated, the plates or sheets of iron preserve their malleability unimpaired, and may be bent and otherwise worked as easily as before they had received such coating—a result which appears to be due to the interposition of the coating of tin between the zinc and the iron, by which interposition the chemical combination of the iron and zinc is prevented. Where it is not necessary to use plates of metal of a larger size than that of sheets of tin plate, we take that material as it comes from the manufactories, and have then only to give to it a coating of zinc, to receive which does not require any particular preparation. In the letters patent granted to M. Sorel, it is proposed, sometimes to add a coating of tin over that of the zinc, for the purpose of giving to the article made a brighter appearance, and as an improvement also in culinary vessels; but our process is the reverse of this, and the end attained by us altogether different from that above proposed, and, at the same time, our process produces a new and useful result. What we claim, therefore, as our invention, and as an improvement on the process of M. Sorel, is the preserving the malleability of sheet-iron, whilst it is protected from oxidation by the galvanic action between it and the zinc, in the manner above set forth—namely, by first tinning the said iron in the ordinary way, and afterwards by giving thereto a coating of zinc above the tin."

SCIENTIFIC CORRESPONDENCE.

ELECTRO-MAGNETIC CLOCKS.

To the Editor of the "Inventors' Advocate."

SIR,—In reply to Mr. Lamb's letter, in No. 89 of the "*Inventors' Advocate*," respecting Professor Wheatstone's claim to the invention of the Electro-Magnetic Clocks, I beg to state that I have communicated with Mr. Lamb on the subject, for the purpose of ascertaining whether or not the apparatus which Mr. Lamb received instructions to make on the 6th of January, 1840, was similar to any part of the inventions patented by Mr. Barwise and myself, the principles and advantages of which I communicated to Professor Wheatstone on the 1st of August, 1840, which was before I became engaged with Mr. Barwise on the subject. I have found, as I expected, that Mr. Lamb has been misled, in being made to believe that the apparatus in question was the same as our electro-magnetic clocks. It is not the same, it is entirely different. It is in the first place, for a different purpose,—it is different in its arrangement, and different in its application.

I shall now show the difference between the apparatus on which Mr. Wheatstone has attempted to found his claim, and the principle of the inventions patented by us:—The apparatus in question, and which Mr. Wheatstone has designated his Electro-Magnetic Telegraphic Clock, is nothing more than a common spring clock (minus a pendulum), which he employs for the purpose of carrying round the signal disc of his telegraph, or to carry round hands to indicate the signals; the signals in that case being stationary, the actions of which clock are regulated by electric currents, transmitted through conducting wires by means of an instrument, similar in appearance to a ship's capstan, and worked by hand. Now a few words will suffice to show that the apparatus was never meant by Professor Wheatstone to indicate time. Let us suppose that

it was used for this purpose; a person would require to be continually employed at the capstan transmitting the electric currents, and if that person should neglect his duty for a single second, Professor Wheatstone's electro-magnetic telegraphic clock would instantly stop. I think I need not say more respecting Mr. Wheatstone's invention as far as time-keeping is concerned, for any person who has the least knowledge of the subject will at once see that it was never intended for such a purpose.

Now to explain the invention in our patent: it consists in this—a clock or timekeeper is employed as a regulating power to transmit currents of electricity at regular intervals into conducting wires connected with other clocks and timepieces, to be worked solely by means of electro-magnetism; and these clocks and timepieces are to be acted on by the electric currents from the principal clock, so as to keep the same time to a minute without any regulating or winding up. Now this is what I communicated to Mr. Wheatstone on the 1st of August, 1840. It is not necessary that I should at present enter into the details necessary to carry out this principle, the whole of which I described to Mr. Wheatstone, during various conversations, and at different times after I first communicated the principle; and from the remarks made by Mr. Wheatstone at first, and during those conversations, I know well that he had not the most distant intention of applying electro-magnetism to clocks. If Mr. Wheatstone has anything to say in answer to this, I shall expect himself to reply to it, instead of employing his workman to do it for him, who knows nothing of the communications made by me to him.

With every apology, Mr. Editor, for troubling you with so long a letter,

I remain, your obedient servant,

ALEXANDER BAIN.

35, Wigmore-street, Cavendish-square,
April 14, 1841.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING APRIL 19, 1841.

Monday	Statistical Society	8 P.M.
	British Architects	8 P.M.
	United Service Institution	9 P.M.
Tuesday	Linnæan Society	8 P.M.
	Horticultural Society	3 P.M.
	Civil Engineers	8 P.M.
	Architectural Society	8 P.M.
Wednesday	Society of Arts	7½ P.M.
	Geological Society	8½ P.M.
	London Institution	7 P.M.
Thursday	Royal Society of Literature	4 P.M.
	Royal Society	8½ P.M.
Friday	Society of Antiquaries (Anniversary)	2 P.M.
	Royal Institution	8½ P.M.
Saturday	Westminster Medical Society	8 P.M.
	Mathematical Society	8 P.M.

SOCIETY OF ARTS.

April 14. *Illustration Meeting.*

Dr. Matthew Truman delivered a lecture—"On the Manner in which the Process of Nutrition is effected." For the growth of organic matter, it is requisite that the process of assimilation be performed, by which the food or other alimentary matter is converted into its nutritious particles, known by the name of *chyle* in animals, and *proper juice* or cambium in vegetables. This chyle is taken up by a set of vessels termed *lacteals*, and conveyed by means of the thoracic duct to the large vein near the heart, where it mixes with the returning *venous* or impure blood from the other parts of the body; it is afterwards conveyed to the lungs, and is returned, after being duly acted on in those organs by the process of respiration, back again to the central organ of circulation (heart), as *arterial* or red blood. In this arterial blood all the elements which enter into the composition of the organs of the body are found,—such as

Oxygen—Hydrogen—Carbon—Nitrogen
Sulphur—as found in the hair, albumen, & brain
Phosphorous—as in the bones, teeth, and brain
Chlorine—Fluor—Potassium—Sodium
Calcium—as in the bones and the teeth
Magnesium, Manganese, Silicium } found in the hair
Iron—found in the liver, blood, cartilages, black pigment, and crystalline lens.

There are, however, some few more substances existing in the body, such as *picromel* of the bile, the *saliva* or venom, which are not found in the blood, owing probably to the imperfect state of chemical science.

The blood on being withdrawn from the body, and allowed to stand, divides into the *serum* or fluid part, and the *crassamentum* or clot; but if kept in motion by stirring no such change takes place. When it is considered that every thing becomes deposited or formed from the blood, it is interesting to inquire as to the cause which operates in regulating the peculiar depositions in the different parts of the system; but on this point Dr. Truman considered that little was as yet known. Many physiologists assert that this deposition of newly-forming particles occurs at the moment of the passage of the blood from the arteries into the veins in the capillaries; others, however, differ in this opinion.

It was stated that the globules of the blood of the frog were eight times as large as the globules comprising the muscular fibre of that reptile. That those of the rabbit were only half the size of the globules forming the nervous fibre of that animal. He could not consider that all was formed then from the adhesion of globules of the blood, but he was inclined to believe that the intimate structure of the organs themselves exercised a very great influence over the deposition of new parts, and that some regulating property is to be sought for in these very organs.

He passed on to notice the extent of the cellular membrane, and that it was capable of conveying not only air and fluids from one part of the body to the other, but that it also possessed the property of allowing hardened substances to pass all over the body; in proof of which he observed, that when pins and needles are swallowed they mostly find their way into the cellular membrane, and work their way along it until they reach the surface of the body, when they may be extracted. The consideration of this membrane led Dr. T. to allude to the laws of *Endosmose* and *Exosmose* as established by Dutrochet, an account of which has already been inserted in our Journal, when treating of other subjects.

He then considered how the different elements alluded to above, as existing in the blood, become introduced into the system; and he explained that nearly the whole of them are met with to a greater or less degree in the vegetables used as food. To instance only a few: *manganese* is found in the vine, in figs, grains of wheat, &c. *Copper* in coffee, &c., and M. Sarzo has computed that the French people must consume at least 10,000 lbs. weight of copper annually in this simple article of diet. *Phosphorous* has been found in onions, &c. *Sulphur* in hops, ginger, assafœtida, and in a purer state in some of the seeds of cruciferous plants, such as mustard.

Dr. T. considered with other physiologists that *air* is of the greatest importance to the nourishment of vegetables, and that they obtain the larger proportion of food from it, and not from the earth as generally and popularly imagined. Moisture and darkness is requisite for the germination of seeds, and on this principle the pips of oranges had been made to grow in the waistcoat pocket, and gooseberry seeds in old books.

When alluding to the rapid growth of vegetables, Dr. T. stated that Mr. Ward had observed a plant to grow four inches in 20 minutes, and that the *Bovista Gigantea* had been reputed to have grown from the size of a mere point to that of a large gourd in a single night. Several instances were mentioned as to the growth of plants without contact with the earth, such as the *air plant* of South American, which even grows on the iron bars of the prisons, &c.; the *red snow* likewise isolated from the soil. But although growth may take place in the vegetable kingdom by the simple presence of air, yet such is not the case with animals, although there are some instances of great rapidity of growth among those insects nearest allied to plants.

After entering further into detail, Dr. Truman stated as his belief, that respiration is a function of nutrition, and not, as is generally asserted, for the simple conversion of impure venous blood into pure arterial blood; and in order to explain his assertion more fully, he stated, that the air was doubtless filled with countless myriads of *animalcules*, and that if the whole of these could be collected in a mass their bulk would equal, or even surpass, the bulk of existing animals on the earth's surface; an assertion we are by no means ready to admit, although we have thought it but right to state the views entertained by the lecturer.

NUMISMATIC SOCIETY.

April. C. F. Barnwell, Esq., in the Chair.

A paper was read by Benjamin Nightingale, Esq. on certain unpublished facts relative to Thomas Simon, the celebrated English die-sinker, during the Commonwealth. It comprised the petition of his widow to Charles II., claiming £2,243, due to him from the Mint. This document proves that Simon must have died previous to A.D. 1666, contrary to the opinion of Mr. Beyne. This petition was found in the Audit-office, by James Cunningham, Esq.

A note was read on the subject of the Saxon pennies, with the name CIOLVULF or CEOLVULF, the writer believing that those with E may be assigned to the 1st *Ceolvulf*, but doubts that all with I may be assigned to the 2d *Ceolvulf*, also those reading Duobornea, C.

A letter was read from Mr. Samuel Birch, on an unedited brass coin of *Demetrius* II. of Syria, in the British Museum, discovered by Mr. Doubleday. It represents the Parthian monarch and the Fortune of the King taking hands, in allusion to the Captivity of the Arnonaut and alliance with the Court of the Arsacidæ.

A paper on some unedited coins of the Lower Empire, from H. P. Barrett, Esq., one of Theodore Lascaus, with the inscription Λ Α C Κ Α Ρ Ι C, and another of Michael VIII. in gold, forming part of a deposit of nearly 4,000 gold coins found near Smyrna in 1840: all, except half a dozen of Lascaris and eight of Michael, were of the Emperor John; and similar to that in De Saulay, Pl. xxiij. No. 2. Two unpublished seals in lead of Theodora wife of Michael VIII. are also described (one of these has been already engraved and published by Francesca Carrare, 1840.)

A note on a silver titradrachm of Juta II., recently acquired by the British Museum, was read by Mr. Samuel Birch. It is formed on the model of the Synai titradrachms, having a royal head filleted on the obverse, and on the reverse a horse galloping and Phenician legend, read by Gesenius *Beth khem Malchi*, the perpetual house of the Empire. Mr. B. imagines this may be a counterpart of REX IVBA.

Presents were announced of their transactions from the Royal Irish Academy, two large medals of Otho King of Greece, and his wife Amaia, and the Greek Archbishop Germanus, from Count Maurier Von Dietrichstein of Vienna. The following gentlemen were admitted as members;—Rev. T. F. Dymock, Ch. M. Frachu, M. of Acad. of Sciences, St. Petersburgh; F. Perkins, Esq., H. Holland, Esq., H. Lacocke Irving, Esq., L. Hayes Petit, Esq., W. Bart. Bradfield, Esq., Rev. G. Fred. Nott, D.D.

METEOROLOGICAL SOCIETY.

April 13. *Lieut. Morrison, R.N., in the Chair.*

After the minutes of the preceding meeting had been read and confirmed, the following gentlemen were proposed as members;—Col. Wylde, R.A., W. Stocken, Esq., Alderman Bilson, Portsmouth, and W. Parker, Esq. Several donations of books were announced, and meteorological tables were presented from High Wycombe, Yarm, Thwaite, Gosport, Hereford, Dundee, Sheffield, Canterbury, Bromsgrove, Cleckheaton, Lisbon, Nice, and other places.

The secretary then read a paper from Henry Lawson, Esq., Hereford, on the most advantageous method of placing thermometers to face the four cardinal points of the compass, with a view to obtain the true temperature both in the sun and shade, with the least possible radiation or reflection.

The secretary then exhibited linear ranges of the barometric curves, taken at the four cardinal points of England, and also the mean of England, and the mean of Ohio, U. S. These curves possess the highest interest, and show the motion of the atmospheric wave during its transit across the Atlantic, which requires from three to five days; but the range in the U. S. was only one-third of that of England.

ANTARCTIC EXPEDITION.

The following letter from Sir John Franklin, addressed to a friend in England, relative to the Antarctic Expedition, under the command of Capt. Ross, was published in the last number of the *Athenæum*:—

"Government House, Hobart Town, 17th Nov. 1840.

"You will rejoice to hear that Ross and Crozier, having procured all the observations which Ross thought it necessary to make in this visit, and having seen the permanent observatory arranged in every way satisfactorily to himself and Kay, sailed on the 12th of November. I had the pleasure of accompanying them until they got a steady breeze, which enabled the ships to lie well to windward of the projecting cape, and would secure their being far in the offing before dark. Never men commenced an enterprise in higher hope and zeal, or under circumstances more favorable—officers, men, and ships being alike eminently fitted for the service. The intention of Ross is, to proceed first to the Auckland Islands, then successively to Campbell, Macquarie, and Emerald Islands, at each of which stations he hopes to obtain a series of magnetical and other observations, before the proper time arrives for his proceeding to the southward. I quite agree with him in the opinion that, as regards the South Magnetic Pole, nothing has been done to interfere in the least with his having the entire merit of determining its position. The observations made by the recent navigators in this quarter can only be looked upon as affording a very rough approximation as to its probable locality: if the spot cannot be approached, a far more extensive series of observations than has hitherto been made, at stations widely separated, must be obtained, before its position can be determined in a satisfactory manner. But I cherish the hope that Ross will be able to reach it, and thus gain another flag to his armorial bearings. He will likewise establish the insularity or otherwise of the land seen by Balleny, D'Urville, and the American exploring squadron.

"I have no doubt that Ross has given you a full description of the 'Rossbank' magnetic observatory—any account of it from me would, therefore, be superfluous. I know that he considered it complete in its arrangements, and that he left us perfectly assured of his instructions and wishes respecting the observations being faithfully carried out. On Kay and his two companions he can safely rely; and whenever further assistance is needed—such as on term-days or in case of sickness—I shall have great pleasure in giving my own personal help, and in procuring that of others. We are, at this time, about to prepare some assistants for the term-day on the 27th of this month; so that, following the course hitherto held by Ross, the three magnetometers may be simultaneously observed at every two minutes and a half. I visit the observatory daily once, and generally twice, and shall continue to do so, that I may give the observers encouragement, and, at the same time, enjoy, myself, a gratification which these pursuits never fail to afford to me. I am delighted with their entire equipment, and have only to regret, with many others, their want of an electrometer on which reliance could be placed; but this instrument, Ross tells me, is now under the consideration of the Committee of the Royal Society. I could have wished also that the instructions had directed attention to lunar influences, which you may remember have long been a favorite idea of mine, and which I am happy to perceive are broadly stated to have an effect on the needle in the letter from M. Kreil to M. Kupffer, communicated by yourself to the *Phil. Mag.* of April 1840.

"The depth of soundings obtained by Ross must have astonished the *savans* as well as seamen. We are anxious to know what deductions are drawn by you, and those who will carefully study the interesting points connected with these observations; the increase of the temperature at great depths in the vicinity of volcanic islands seems to be proved by them."

MEMOIR OF MR. CHRISTOPHER TATE.

The following biographical notice of the late Mr. Tate, is taken from the *Tyne Mercury*. The successful struggles of genius with poverty are at all times interesting records and useful stimulants, and though in the present instance the health of the individual failed before he attained the full reward of his honorable labours, yet this short memoir of his life shows that the greatest difficulties had been overcome, and that he was about to gather the harvest, when death arrested his progress.

Mr. C. Tate, the sculptor of Newcastle, died in London, on Monday forenoon last. A few months ago Mr. T. proceeded on a voyage up the Mediterranean for the benefit of his health, which had been long in a declining state; and after remaining some weeks at Malta he returned to England by the Great Liverpool steamer. On his arriving in London, he was conveyed to a house near the place where he landed, and soon after breathed his last.

To say that Mr. Tate had arrived at the height of his profession is not what will be looked for; but, considering his early age, and the difficulties he had to contend against at the commencement of his career, he had raised for himself a reputation as an artist which extended far beyond the town where he resided; and many of the most talented men in London had expressed an opinion that at no distant period he would take his place as an equal to some of the masters of the age. He served his apprenticeship as a marble mason with Mr. Davis, of Newcastle; and there is no doubt, during that period, he acquired some knowledge of the art in which he afterwards became so great a proficient. Indeed, this must have been the case, as we find that soon after his servitude was expired he became assistant to Mr. Dunbar, the sculptor, at that time residing in Newcastle. He now turned his attention to modelling, and the busts of some of his early friends was the result of his spare time. One of those found its way into the Exhibition at the Northern Academy of Arts, and, although the artist was then unknown to fame, it was much admired for its chaste and highly-finished appearance. After remaining with Mr. Dunbar for a few years, Mr. Tate left his service. It now became a serious question with the young artist, whether he should endeavor to make his way in the world, or whether he should continue in the humble sphere in which he commenced life. He commenced the struggle—he persevered with undaunted energy—and just at the time when he had gained an independent footing his days have been prematurely brought to a close. His first efforts, after leaving Mr. Dunbar, was the study of a "Dying Christ," suitable for Catholic chapels, &c. It stamped the character of the man as an artist, but it left him miserably bare in a pecuniary point of view. Fortunately, at this time, through the application of some friends of his wife, he procured an order for the execution of a marble tablet, to be erected at Weardale. After this was completed, he commenced his celebrated statue of "Blind Willie;" but he never was sufficiently repaid for the trouble and expense that it cost him. Tate's acquaintance had now become considerably increased, and he was often benefited by such circumstances as the following:—

A master bricklayer in Newcastle, but rather an illiterate man, inquired for Mr. Tate on a Sunday morning. On Tate making his appearance the visitor said—"he had just called to know what be would charge for *making a monument* of him."—The bricklayer agreed to Tate's price, a bust was executed, and an excellent one it was.

It is needless to trace the progress of Tate through his various works. His busts, for execution, precision, and arrangement, can scarcely be excelled. Those of the Duke of Northumberland, H. Phillips, Esq., David Urquhart, Esq., Sheridan Knowles, Esq., Geo. Straker, Esq., Miss Elphinstone, the Rev. Mr. Worswick, and numerous others, both of public and private individuals, have been exhibited to the public, and are sufficiently known and appreciated. Many monumental tombs which he executed are to be found in the churches and churchyards in the vicinity, and amongst them one in St. Thomas's Church, to the memory of the Rev. Mr. Wasney. The grouping in the "Judgment of Paris," and the "Musedora," which he finished some years ago, would have done credit to an artist of far greater experience. All the artists who saw them were astonished that so young a man should have commenced with such difficult subjects. His various models and studies pourtray an original and a vigorous mind. Previous to his departure for Malta he had been engaged on a statue of the Duke of Northumberland, to be placed in front of the Master Mariners' Asylum at Tynemouth, and this remains unfinished in his studio. It is, however, satisfactory to know that the face, hands, and all the difficult parts have been finished, and it may easily be completed by a person of ordinary talents. Mr. Tate was 29 years of age.

SCIENTIFIC MEMORANDA AND NOTES ON ART.

Horticultural Society of London.—A very numerous meeting of members was held on Thursday week at the Crown and Anchor Tavern, Strand, J. Milner, Esq., in the chair. Mr. Rogers, of Eaton-square, exhibited a new seedling rhododendron; Mr. Gaines, of Battersea, a stand of heartsease; and Mr. Dickson, of Acre-lane, a number of auriculas, among which were some very good seedlings. Mr. Masters delivered a lecture on the progress of Horticulture in this country, from the earliest times to the close of the sixteenth century, pointing out the dates of introduction of many of our most approved fruits and vegetables.

Scientific Association in Italy.—The meeting of the scientific men of Italy is to be held this year at Florence, and next year at Padua. There is still some speculation in Italy on the point whether the Pope and the King of Naples will continue the prohibition which they enforced last year, when none of the Roman or Neapolitan professors were allowed to be present at the meeting.

Fossil Rain Marks.—Singular as may appear the notion that the impressions of rain should be recognisable and be recognised on the surfaces of stratified rocks, the opinion is held by some eminent geologists, on the evidence of specimens of new red sandstone taken from the Storeton Quarries, near Liverpool. In March, 1839, Mr. Cunningham, to whose researches in the Storeton Quarries, we are indebted for much of our knowledge of the foot-prints of Cheirotheria and other ancient animals, communicated a paper on the subject to the Geological Society of London. "In examining some of the slabs of stone extracted at the depth of above thirty feet, Mr. Cunningham observed that their under surface was thickly covered with minute hemispherical projections, or casts in relief of circular

pits in the immediately adjacent layers of clay. The origin of these marks, he is of opinion, must be ascribed to showers of rain, which fall upon an argillaceous beach exposed by the retiring tide, and their preservation to the filling up of the indentations by sand. On the same slabs are impressions of the feet of small reptiles, which appear to have passed over the clay previously to the shower, since the footmarks are also indented with circular pits, but to a less degree; and the difference Mr. Cunningham explains by the pressure of the animal having rendered these portions less easily acted upon."

A Stone Imbedded in Wood.—In cutting up a log of American pine lately, at the saw mill, Dalderse, the saw struck some hard substance. On removing the log, which is twenty inches thick, a stone of three and a half ounces weight, having several angles, was found six inches from the nearest surface, with the texture of the wood all firm around.—*Glasgow Courier.*

Preservation of Wood, Cordage, &c., from Rot.—We have on several occasions noticed the process of M. Boucherie, in France, for preserving wood from decay by the natural impregnation of the fibres with various salts. These experiments have, however, in their practical effects been anticipated in this country by Mr. Kyan, whose process of protection extends to ropes and other vegetable substances exposed to decay. We have seen numerous testimonials which prove the efficacy of Mr. Kyan's plan, which consists in impregnating the timber with a strong solution of corrosive sublimate. To effect this, it is found to be sufficient to permit the wood to lie covered with the solution for a few days or weeks, according to its thickness, and then to dry it in a place not exposed to the sun or rain. The extensive proof of this process in situations most calculated to produce decay, is the best evidence of its excellence.

To Wash Iron or Steel with Copper.—Dissolve sulphate of copper in water, in the proportion of one to three; wash iron or steel with it, and it will instantly be covered with reduced copper. This is best performed by applying the solution with a brush, which must be followed directly with a sponge of clear water. In this manner any letters or figures may be drawn with a camel-hair pencil or a pen, and if it be on polished steel, the letters or flowers will assume the brilliancy of the steel, and appear like highly polished copper. It may sometimes be requisite to cleanse the metal by washing it with diluted muriatic acid, that the copper may adhere the more readily. If the steel thus ornamented be held over a charcoal fire, the copper figures become blue first; and when the steel becomes blue, the copper takes a gold colour; but is restored again to its original color by diluted muriatic acid.

To give Iron the Whiteness of Silver.—To nitric acid, diluted with an equal quantity of water, add as much mercury as the acid will dissolve; then add to the solution three or four times as much water, and having given the iron a coat of copper, as directed in the above experiment, brush it over in the same manner with the diluted nitrate of mercury; its appearance will be equal, if not superior, to that of real silver. In this manner any common or rough iron work may be apparently silvered at a most insignificant expense.

Rochester Water Power.—The water power of our city, says the *Rochester Daily Advertiser*, is estimated to be equal to one thousand nine hundred and twenty steam engines, of twenty horse power. The river supplies about twenty thousand cubic feet of water per minute, when it is at its medium level.

The New Musket.—A correspondent in St. Petersburgh has informed us, that the Russian Government has at length resolved on the adoption of the musket invented by the Baron Heurteloup, and of which mention has been made in this paper. It appears that this resolution was not agreed on until after numerous experiments had been made with 2,000 muskets, for a period extending from the beginning of the month of February last, until this moment, during which time every variety of climate and temperature had been experienced, and when the thermometer was frequently so low as 25 degrees of Reaumur. During these experiments nearly one million shots had been fired without a single failure, and until, as our correspondent expresses it, the officers appointed to watch the proceedings became tired with the monotony of the experiments, in which they could find nothing faulty to report. It seems also that some guns on the copper-cap principle had been tried at the same time, but had been absolutely rejected, as it was found that in particular states of the atmosphere, wherein great cold and moisture were present, the guns on the principle of the copper-cap were subject to many most serious objections. In point of fact, the number of effectual shots made with the Baron Heurteloup's gun were, beyond all comparison, infinitely more numerous than those made with either flint locks or percussion caps, which the officers charged with the duty of making the experiments attributed to the fact of the lock being placed below the stock, thus offering no obstruction either on the score of fire or smoke to the accuracy of the soldier's aim, independently of the sense of safety which is experienced from using an arm which by no possible chance can fly or eject any *detritus* to injure his face or person, an advantage which was not found to exist always in the copper-cap gun.—*Times.*

The exchange of flint for percussion cap guns to the army will cost this year £130,000.

Rocket Practice in China.—The report just received of the attack on the Chinese forts and shipping mentions the projection of Congreve rockets, as a part of our means of offence which was called into operation. These auxiliaries to our artillery were supplied, no doubt, from the stores of the East India Company, who keep a large stock at all times in India. Among the many causes for edification and astonishment which the "Emperor of the Sun and Moon," with his strange people, will have had, as the consequences of this collision with our forces, will be the circumstance of the superiority of our fireworks. It is a fact, we believe, that the Chinese are the real inventors of the rocket as an artificial firework, and even as an instrument of war; its capability, however, for this second object, in their hands, being confined—so trifling is its projectile force—to a simple means of annoyance, instead of destruction, for confusing the ranks of cavalry. It is to the late Sir William Congreve, after many years of practical experiment, that this weapon owes its present character for destructiveness and precision of flight. To him belonged the merit of manufacturing rockets of almost unlimited weights; of bringing up the range, for instance, of the 32-pounder to 3,000 yards, and of gradually increasing the power of even the 12-pounder to the penetration, at 1,200 yards distance, of a solid bank of earth to the depth of 20 feet. We must add, also, as the inventions of the late Sir W. Congreve, the substitution of strong iron for paper cases, and the fixing of the stick by a screw in the axis of the rocket, instead of by binding on the side, so as to give it the straightness of the arrow. Great, we repeat, must have been the consternation of the Celestial nation at such a visitation of their native and familiar plaything, with its appalling roar, and, to them, new and gigantic dimensions and powers of destruction. In the case of the Congreve rocket, it was thought at one period just to give the inventor a pension of £1,200 per annum, which he enjoyed for very many years, and now to continue to the widow £300 of that pension. Yet it is notorious in the Ordnance Department at Woolwich, that the commonest care has never been observed to preserve a secret thus handsomely paid for, which would have been a much easier task than in many other cases, as a mere specification in writing will not adequately teach the art without the aid of practised workmen, and many of these have been turned adrift as readily as common laborers.—*Correspondent of the Times.*

Design for a New Roof to the Guildhall.—This noble and elegantly-proportioned hall has evidence in its present state, by the very large buttresses exhibited in the interior, of having possessed in former days a splendid Gothic roof. The present flat ceiling was erected after the destruction of the old wooden roof at the great fire of London in 1666. It is well known that it was built as a temporary expedient, and it has been kept up by repeated repairs from time to time, and is not at all in character with the other parts of the structure. A perspective drawing, which details the effect of what is supposed to be the character of the old roof, has been for some days exhibited in the reading room of the corporation, and attracted great admiration. It shows how it may be easily restored without injury to any part of the present walls or openings. It is proposed to alter the present circular-headed windows, running along the sides of the hall, into pointed windows, built in the interior of the present windows, and ornamented with stained glass; the effect of the present tracery to continue for the purpose of carrying up the character of the present hall; and from thence the new roof will spring, of a similar construction to those at Westminster, Eltham, and Hampton Court, enriched with pendents and ornamented open arches. The soffet, or ceiling, will be pannelled, and enriched with bosses at the intersection of the mouldings. The design has been drawn by Mr. Edmund Woodthorpe, son of the town clerk.

The Planets Mars and Venus.—Mars has again paid us another visit, and is now rapidly approaching the point of his nearest approach to the earth. It is more than two years since he appeared in the same position. This planet may now be seen, about 10 or 11 o'clock in the evening, not far from the south-east quarter of the heavens, at a low elevation, and may be distinguished from other stars by its size and ruddy appearance. Venus still continues to shine with splendour like a small brilliant moon in the western and south-western sky. Towards the end of April it will appear like a slender crescent, but more expansive than at present, or like the moon when about two or three days old. From the present period it will gradually appear less elevated at sunset, and about the beginning of May it will appear near the horizon a little after sunset. In less than seven weeks it will have disappeared from our evening sky. Jupiter will not be seen in the evenings till the month of May, nor Saturn till the month of June.

Edible Swallows' Nests of Java, &c.—Dr. Meyen thus explains the precise composition of this article of luxury with the Chinese:—The weed which composes this branch of commerce is *Sphærococcus cartaligineus* var. *Setaceus ag.*, which is found in great abundance in India, &c. It is eaten by the bird *(Hirundo esculenta)* which builds the nest in question, and is used in the preparation of its previous nest. The swallow eats the fresh weeds, and permits them to soften for some time in its stomach, after which, it throws up the mass, now converted into a jelly, and sticks it together to form the nest. The nests, which are subsequently smeared over with dirt and feathers, are brought in their raw state to China, where they are cleaned in immense warehouses built for the purpose, and then exposed for sale. These so celebrated Indian nests are, therefore, hardly anything more than the softened *Sphærococcus cartaligineus*, which we have brought with us from the Chinese seas; and their effect is no other than that of fine jelly. In the preparation of these nests such a number of fine stimulants are generally added, that they of right occupy the first rank amongst relishes at the tables of the Chinese. The Japanese had long ago discovered that these costly birds, nests are nothing more than softened sea-weed, and now prepare the substance itself in an artist-like manner. Some of our own epicures may be glad to learn that the *Sphærococcus crispus*, which Dr. Meyen thinks would serve just as well for the composition of this luxury, is found in large quantities on the western and northern coast of Great Britain.—*Jameson's Journal.*

Adulteration of Bone Dust.—It appears that saw dust, slacked lime, and numerous other ingredients, are now mixed with bone manure; so that in some cases the admixture not only destroys the nutritive qualities of the bone dust, but is most injurious to turnip seed. The great increase in the use of this fertiliser renders these facts important. Large quantities are now imported from abroad, in addition to the enormous mass annually collected in this country;—thus it appears, that in 1823 the declared value of bones imported was £14,395; and in 1837 it was £254,600; and since that period that amount has probably doubled.—*Quarterly Journal of Agriculture.*

VARIETIES.

Glass.—From a Parliamentary return, it appears that the total amount of duty charged on glass in the year 1840 was, in England, £890,211, in Scotland £65,885, and in Ireland £9,876; total, £965,972. The amount of drawback paid on exportation was, in England, £208,600, in Scotland £30,472, and in Ireland £628; total, £239,700. This return includes all descriptions of glass.

The Iron Trade.—The iron-masters' quarterly meeting was held in Wolverhampton on Wednesday, at Wallsall the previous day, and at Birmingham on Thursday. There is no advance in iron, and we have not heard of any nominal reduction of price; but our accounts state the trade to be very flat and its aspect gloomy.—*Staffordshire Examiner.*

The Railway Mails in Scotland on Sunday.—By the Railway Act, recently passed, the Postmaster-General has power to compel the directors of any railway to carry the mail, but there is nothing said as to the charge which the company are entitled to make. The directors of the Scotch railways have shown themselves willing to carry the mail on the week days at a moderate expense, looking to the fares of the passengers for their chief remuneration; but on Sundays they decline to carry passengers, and they say to the Postmaster-General, "If we are to run a mail train on Sunday, you must pay the whole expense, for we shall carry no passengers." In these circumstances, the Postmaster-General has declined to pay the whole expense of a mail train, preferring on that day the ordinary coach conveyance to the far dearer, though quicker mode of transmission by railways.—*Scotsman.*

Launch of the Princess Royal Steamer.—On Monday, a new steam-ship, named in honor of the Princess Royal, was launched from the yard of Messrs. Wigram and Green, at Blackwall. The new vessel, a very handsome one of her class, is destined for the service of the General Steam Navigation Company. The Princess Royal is a stout-built vessel, formed of English oak, of 800 tons burden, with a lofty poop deck. The extreme length is 181 feet 8 inches, width between the paddles 28 feet, depth of hold 17 feet 6 inches, and extreme breadth outside her paddles 48 feet. She is built sharp forward, with a flat bottom and good beam. Her construction is somewhat peculiar, but it is expected she will make a capital sea boat. She is to be fitted with engines and machinery of 260 horse power, at the General Steam Navigation Company's factory, at Deptford.

Smallest Sea Steamer.—"Malta, March 20.—The Peninsular and Oriental Company's iron steam-packet Lotus (John Moody commander) is worthy of particular notice. She is only 34 tons burden, and 24-horse power. *She draws only two feet of water.* She was built by Messrs. Ditchburn and Mare, of London; the engines are by John Penn and Son, Greenwich. The engines and boilers of the Lotus are of very superior construction, having oscillating cylinders, well-known and valued for the exceeding small space which they occupy, as well as their lightness, simplicity, and elegance. Indeed, the whole construction of this steamer is a miracle of art and mechanical skill. The Lotus is, perhaps, the smallest steamer in the world which made so long a voyage at sea. She encountered the dreaded Bay of Biscay, and got safely across; from Gibraltar she was towed by the Oriental to Malta; she leaves here shortly for Candia, thence she will proceed to Alexandria, and the Nile, the place of her destination. On Tuesday noon the Lotus cruised in the Great Harbour and about its mouth, attracting the attention and commanding the admiration of everybody. She made eight knots an hour; she went as smooth through the water as a duck, or rather an arrow shot through the water. Outside of the harbour the Lotus was saluted by "the monsters of the deep," a shoal of porpoises, who frolicked and gamboled about her prow, reminding one of Venus sailing in her shelly car across the briny wave, with all the finny tribes in gay and silvery attendance."

The large steam-ship *Wilberforce*, lately belonging to the Hull Steam Packet Company, has been purchased by the General Steam Navigation Company, and is now added to their numerous and powerful fleet. The purchase money was £11,500, which is less than the original cost of her engines, machinery, and boilers. The *Trident*, a steam-ship of 1,000 tons burden, is now building at Wigram and Green's yard for the General Steam Navigation Company, and will be launched in June.

Improvements in Knightsbridge.—The *Mirror* of Saturday, contains an engraving and notice of the splendid pile of buildings recently erected at the south end of Lowndes-square, Knightsbridge. This pile is characterised as an

Italian composition of *seven houses, so arranged as to appear but one building*; the entrances requisite for different occupations alone marking the distinction. The idea has been to give to the whole pile the character of an Italian palace; in which design the architect, Mr. Lewis Cubitt, has admirably succeeded. The elevation consists of three divisions; viz., 1. The basement story and ground floor. 2. The first and second pairs. 3. The third and fourth pairs. The basement story of servants' offices is retired behind a strong *grille* of iron-work, ranging with their porches, and of new design and arrangement; the ground floor is rusticated entirely, or in quoins, and the windows are deeply recessed. The first floor has rusticated quoins and arches and other window dressings. The upper stories have a different style of window-dressing on each range. The ground plan of the whole pile presents nearly a right angle, the Lowndes-square side being about 133 feet, and that in Lowndes-street about 131 feet. The depth of the principal houses, five in number, which front the square, is 100 feet each, including stables.

The Saddlers of Philadelphia petitioned Congress for a protective duty on foreign manufactured saddlery and harness.

Lead.—Mining operations in the Peak district of Derbyshire continue with unabated vigor; notwithstanding, lead is not so well sold as it was a little time ago. A few adventurers have opened fresh adits, and have met with pretty good success. The old mines continue to hold out very well, and large quantities of ore are raised.

Growth of Flax in Ireland.—The society recently established in Belfast, for the promotion and improvement of the growth of flax in Ireland, is meeting with every encouragement. Lord Templetown has accepted the office of vice-president, and contributed a donation of £50 towards furthering the objects of the society. The Belfast merchants and flax-spinners have also contributed very munificently.—*Dublin Monitor.*

Accident in a Sperm-oil Manufactory.—On Tuesday afternoon, a young man, named Hezekiah Gage, in the employ of Messrs. Bicknell and Co., sperm-oil manufacturers, Newington butts, was superintending a large cauldron of oil in a boiling state, when, by some accident, he fell into it. He has sustained so much injury that it is utterly impossible he can survive.

Sunderland Manufactures.—The largest quantity of glass ever exported at one shipment from any port of Great Britain is now being shipped at this port, on board the brig Jane, Capt. Mordey, for Montreal, from the Wear Glassworks, Bishopwearmouth, the property of J. Hartley, Esq. The cargo consists of broad sheet glass, 300 crates, 200 sheets each; 298 boxes, 100 sheets each; and 216 boxes, 200 sheets each. German sheet glass, 920 boxes, of 50 sheets each; Crown glass, 920 boxes, of 50 sheets each; total amount, about 250,000 sheets. The drawbacks will amount to about £8,600.—*Northern Times.*

The Oldest Bridge in England.—The oldest bridge now existing in England is the triangular bridge at Croyland, in Lincolnshire (sometimes called Crowland,) which is said to have been erected about A.D. 860. It is formed by three semi-arches, whose bases stand in the circumference of a circle, equi-distant from each other, and uniting at the top. Nicholson says that this curious triune formation has led many persons to imagine that the architect intended to suggest an idea of the Trinity thereby.

British Museum, on Easter Monday.—The British Museum was crowded with visitors, and upwards of four thousand persons went through the rooms in the course of the day. The attendance at the National Gallery was greater than has been known on any holiday occasion.

Zoological Gardens.—The large boa constrictor which lately finished its meal by gorging its more weakly companion was fed again on Thursday at the Zoological Gardens. He was liberally supplied with guinea-pigs and rabbits, and soon relapsed into his natural state of torpor. The fate of his companion has been confirmed by this singular reptile having voided many of his scales. The female giraffe is very healthy, and is expected to have a brood in June. The two pheasants, the argus and the fireback, presented by Mr. Cumming from the Manillas, have stood the winter in good health, notwithstanding the unusual severity of the season. Amongst the monkeys are four or five of the Sykes's monkey, recently received from Madagascar. A young wombat, from Port Arthur, has lately been presented by Sir William Burnett, being the second instance of a wombat being brought alive to this country. Two young tigers are daily expected, as well as a fine collection of animals from India. Several important additional buildings at the gardens are in contemplation by the council, including a carnivora house, and a house with paddocks or yards for antelopes and deer.

Private Bills.—The number of private bills on which petitions have been presented this session of Parliament amounts to 233 or thereabouts. Out of these bills, 13 have already received the Royal assent, and several of the others are in an advanced stage of progress. These bills embrace almost every description of private enterprise.

Mortality in the Metropolis.—The number of deaths from all causes in the metropolis and neighbouring districts amounted during last week to 780, which is 146 less than the weekly average in the three last years.

The Theatres.—Easter Monday is generally full of importance in the theatrical world, as the term of opening the seasons of summer houses, and bringing out splendid novelties at those already in full career. Of the former, the Haymarket renewed its course, which has not been long discontinued. The meantime has, however, been most diligently made available in repainting and decorating, so that the theatre inside now presents an appearance fully equal to that of any other in London. As to the performances, there was nothing new; and as some of the performers on whom Mr. Webster relied for assistance, are on board the missing *President* steam-ship, he has been obliged to have recourse to such means as were at hand for opening the season with respectability. Astley's has commenced its equestrian theatrical performances with another "new grand equestrian, historical, military, romance," professing to be founded on the Crimean war of independence, which serves for a good stage spectacle in which the horses can be introduced. The Olympic, over the fortunes of which house a cloud was cast before Christmas, again appears in sunshine. Three new pieces were produced on the first night, each of which was successful. The acting and getting up of the performances indicate renewed vitality and augur success. The Victoria, and the Surrey, and the New Strand, have also re-opened their doors for the summer very promisingly. Covent Garden theatre brought out a "fairy extravaganza" named *Beauty and the Beast*, which is got up in a style of even greater splendour than the preceding spectacles of the kind which Madame Vestris has so often produced. The accompaniment to this has been nightly *London Assurance*, which continues, notwithstanding its exaggerated unnatural incidents and characters, to prove attractive from the excellent acting, and its beautiful scenery. The English Opera House brought out a new musical piece, the *Deer-Stalkers*, with good success. The German Opera company, at Drury Lane, made no special efforts to amuse the Easter holiday people, but *Der Freischutz*, with its beautiful music, as sung and performed by the present company, proved sufficiently attractive to draw a full house.

We are happy to announce that Mr. Macready has become the lessee of Drury-lane Theatre. This undertaking, so honorable to Mr. Macready, will be greeted, as it ought to be, by every lover of dramatic literature.—*Morning Chronicle.*

Mademoiselle Mars's Farewell to the Stage.—Mdlle. Mars has taken her final leave of the public in Paris in her great part in Molière's play of the *Tartuffe.* At the close of the performances the curtain rose, and presented Mdlle. Mars to the audience, for the last time, surrounded by the colleagues from whom she was finally separating herself,—the men clad in black and the actresses in white robes. Her farewell was made in silence; and the enthusiasm and excitability of the play-going population of Paris seem for this once to have been softened into sadness.

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Chemist.	Mechanics' Magazine.
Chambers' Information for the People.	Mirror.
Civil Engineer and Architect's Journal.	Mining Journal.
Gardeners' Gazette.	People's Magazine
Glenny's Gardeners' Gazette.	Philosophical Magazine.
Gardeners' Chronicle.	Polytechnic Journal.
Gentleman's Magazine.	Provincial Medical and Surgical Journal.
Lancet.	Railway Magazine.
Law Magazine (Monthly).	Railway Times.
Legal Observer.	Railroad Quarterly Journal.
Literary Gazette.	Repertory of Arts.
	Spectator.

ACTS OF PARLIAMENT.

PATTERNS,—
27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17 (The last relates to patterns and *models.*)

PATENTS FOR INVENTIONS,—
2 and 3 Victoria, c. 67.

SCULPTURES,—
38 Geo. III., c. 71.

ENGRAVINGS,—
7 Geo. III., c., 38; 17 Geo. III., c. 57.

COPYRIGHT,—
8 Anne, c. 19; 12 Geo. II., (Booksellers' Act), c. 36; 15 Geo. III. (Universities' Act), c. 53; 54 Geo. III (General Copyright), c. 156.

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THE

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A WEEKLY BRITISH AND FOREIGN MISCELLANY OF

SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

FIAT JUSTITIA, RUAT CŒLUM

No. 91.] SATURDAY, APRIL 24, 1841. [PRICE FIVEPENCE STAMPED, CIRCULATING FREE BY POST.

ACTION OF STEAM IN CORNISH ENGINES.

In former numbers of our Journal we alluded to the original views entertained by Mr. Parkes on the action of steam in the Cornish engines, and to the additional power which, he contends, may be gained by the "percussive" action of steam. The paper on this subject, which was read before the Institution of Civil Engineers, has been since published, with additional notes. We are thus enabled to examine more minutely the grounds on which Mr. Parkes founds his opinions, and, as we believe, to detect the fallacy of the calculations on which they rest. The subject is of great interest, practically and theoretically, and as the notion of the percussive action of steam is advanced on such authority, in so confident a tone, and is apparently supported by numerous experiments, it becomes the more necessary to examine it closely, to prevent error, as we believe it to be, from being recognised as truth.

In a previous article on the alleged percussive action of steam,* we endeavored to show that the mechanical power of steam is only a different, and a less efficacious application of its elastic power; and that this impulsive, or, as Mr. Parkes terms it, "percussive," force, can only be manifested when acting in a comparative vacuum. If we be correct in this opinion, the question is at once disposed of; but the facts advanced by Mr. Parkes make it appear that there is more work done by the Cornish engines than the elastic force of the steam alone could effect, and that there must consequently be some additional force brought into action beyond the ordinarily admitted power of steam.

The facts and estimates connected with the working of the engines at Huel Towan, Holmbush, and Fowey Consols, furnish the data on which Mr. Parkes founds his opinions. The facts to be ascertained are, the absolute resistance offered to the descent of the piston, and the pressure of the steam admitted into the cylinder to overcome that resistance. There is, first, the water load; which, as Mr. Parkes himself observes, "can alone be termed a positively ascertained quantity." The water load on the piston at the Huel Towan engine amounts to 11·01 lbs. on the square inch, to this is to be added the resistance from friction, and from imperfect condensation below the cylinder. These resistances, the former more particularly, are not ascertained, and can only be estimated. Mr. Parkes calculates the friction at 5·75 lbs. on the square inch, and the resistance from imperfect condensation at 1·25 lbs.; together 7 lbs.; which, added to the water load, makes a total resistance against the piston of 18·01 lbs. on the square inch. The amount of the estimated friction is, we believe, much greater than most engineers would be willing to admit, but as it is not our intention to dispute Mr. Parkes's calculations of the resistance, we shall take the quantities as stated.

We have next to consider the estimated quantity and pressure of the steam admitted into the cylinder to overcome this resistance. It is in this part of the calculation that we conceive the great error in Mr. Parkes's calculations rest, notwithstanding the two modes he takes of estimating it; by the indicator and by measuring the quantity of water admitted as steam. As to the latter method of estimating the pressure of steam on the piston, not the least reliance can be placed on it in engines where the steam is worked expansively. To assume that a given quantity of steam can only do the same quantity of work, however applied, is to deny the advantage gained by working steam expansively, which Mr. Parkes is willing to admit. Throwing aside, then, all calculations founded on the quantity of steam admitted, we shall look merely to the pressures in the cylinder shown by the indicator.

In the Huel Towan engine, during these experiments, the steam in the boiler was at a pressure of 64 lbs. to the square inch. The admission of steam into the cylinder was stopped at about one-fifth part of the stroke; the whole length of which is 120 inches. The highest pressure marked by the indicator in the cylinder is 27 lbs.; and it appears, from the same instrument, that the steam did not rush in through the valve with sufficient rapidity to keep up even this pressure, which was very low, compared with the steam in the boiler. At the time the admission valve was closed the pressure had fallen to about 22. No more steam was afterwards admitted, and the remaining portion of the stroke, about 90 inches, was completed by the expansion of the steam then in the cylinder, added to the momentum previously acquired. By marking the force of the expanded steam during the stroke, and adding the different pressures at different points of it together, it is thus made to appear that the whole pressure of steam on the piston was inadequate to counteract the resistance, and that for the space of thirty inches the piston must have been propelled by some other power than the mere elastic force of the steam as exhibited by the indicator.

It was this apparent deficiency of pressure-power in the steam to bring the piston to the bottom of the cylinder that induced Mr. Parkes to suspect there was some other power called into action to complete the stroke. Now it appears to us, that the pressures marked by the indicator are sufficiently at variance with the known ratio of diminution of pressure by expansion, to throw great doubt on their accuracy; and in the next place, supposing the pressures indicated every six inches of the stroke to be correct, there is a material error in the mode of estimating the mean pressure. For instance, the pressures are given at the *completion* of each six inches, consequently the *initial* pressure is left out of the account, and all the calculations are founded on the pressure indicated after each expansion. This error must be the greatest on the first admission of the steam. We must suppose that the elastic force exerted on the piston on the first opening of the valve must approximate nearly to the pressure in the boiler, yet we find that 27 lbs. is the highest number of the indicator, though the cylinder communicates freely with steam at a pressure of 64 lbs. Were we to assume the initial pressure to be 50 lbs. to the square inch, and then take the mean between the figures of the indicator, the combined pressure of the piston throughout the stroke would, even on this mode of calculating by the indicator, exceed 15 lbs., instead of only 14lbs., as estimated by Mr. Parkes. But if we proceed on the plan of estimating the pressure by the known expansion of steam, and calculate by the indicator's marks of the pressure at the moment the influx of steam was intercepted, and at the termination of the stroke, we shall obtain a much higher result.

For example: the elastic force of the steam when the admission valve was closed is stated to have been 22·8 inches, and at the termination of the stroke 7. This variation, arising from the expansion of the steam, takes place during 96 inches of the stroke. The mean pressure during that

* Inventor's Advocate, No. 83.

stroke may be therefore taken at 14·9 ($22·8 + 7 \div 2 = 14·9$.) This estimate is founded on the supposition that the steam in the cylinder varies in its elastic force according to the variation of its volume, in the same manner as gases and steam in other circumstances. The great heat of the cylinder, however, which in the Huel Towan engine was kept at the same temperature as the steam in the boiler, would have the effect of increasing the elasticity of the steam beyond its ordinary force; therefore, we may safely say the mean pressure on the piston during the part of the stroke after the admission of steam was stopped, would be greater than we have assumed. If we suppose the mean pressure on the piston during the twenty-four inches of the stroke that the steam valve remained open to be 27 lbs, and add this to the mean pressure of the remaining piston, we shall obtain an average pressure throughout the whole stroke of 17·32 lbs. the square inch.

We thus perceive that by pursuing this mode of calculation the power obtained by the elastic force of the steam is within a fraction equal to the total resistance estimated by Mr. Parkes.

There are several minor points in Mr. Parkes's statements that are open to objection; but having thus shown that there is really no extra power obtained beyond what the elastic force of steam could yield, it is useless to inquire into minute discrepancies which invaliate the notion of the "percussive" action of steam. There is one point, however, to which we must allude, as it appears to have been overlooked by Mr. Parkes. If the percussive action derived from the first admission of the steam were so great as by that instantaneous impact to give a momentum equal to one-fifth of the action of the whole steam employed, how happens it that no sign of such a force appears by the indicator? That instrument would, we conceive, be acted on by the "percussive" force as well as the piston, and the absence of any indication of the sudden exertion of the force is of itself sufficient to discredit any supposition of the kind. It appears to us, that the cause of the great "duty" performed by the Cornish engines is adequately explained by the extent to which the expansive power of steam is made available, without its being necessary to cast about for extraneous causes.

ON THE MANUFACTURE OF COAL GAS.

The following observations on the manufacture of coal gas for lighting are contained in a paper read by Dr. Penot, before the Society of Industry at Mulhausen, at a recent meeting. They point out clearly the disadvantage of using wet coal either for making gas or for burning.

"Of all the methods that have been adopted for procuring artificial light there is none which produces so brilliant a flame as the burning of bicarburet of hydrogen; therefore the use of gas is now becoming general in all the principal towns of Europe. Yet the manufacture of gas does not appear to have reached the degree of perfection of which it is capable.

"Having for some time past made many chemical experiments on this manufacture, I ask permission to submit them to you.

"In the first instance I directed my attention to the quantity of water contained in coal when it is distilled, and to the influence this moisture might have over the production of the gas. I took small coal from the boat, just in the state in which it arrived in the basin at Mulhausen, and after having dried it by a moderate application of heat, I discovered that it contained 10 per cent. of water. I afterwards moistened another portion of the same coal until it appeared as wet as coal does after having been exposed to the rain for some time, it then contained 21 per cent. of water.

"I fear this circumstance has not been taken into consideration in the various experiments that have been made on a large scale, either with respect to ascertaining the relative quantity of heat produced by different kinds of coal, or with respect to the advantages to be derived from the new improvement proposed to be made in the apparatus for heating. I do not know if the 21 per cent. would be always a maximum; but if it is admitted to be, 100 kilogrammes of coal made as wet as I have stated would in reality contain only 79 kilogrammes of dry coal, and of that quantity four kilogrammes are necessary to evaporate the 21 of water. There are, then, but 75 kilogrammes of such coal in 100 that can be really available. Thus there will be a difference of 25 per cent. I certainly do not think that coals so wet as those I have mentioned have ever been used; particularly not in experiments; but I much fear that for want of drying the coal mistakes may have been made amounting perhaps to 10 or 12 per cent. This observation renders us aware how great would be the advantage of keeping coal under cover. By that means it becomes dry, and is not liable to the deterioration that some coals are subjected to when exposed to the alternations of dry and wet weather.

"I return to the preparation of gas for lighting. I have distilled the coal containing 10 per cent. of water till entirely exhausted. This gas after having been purified in the usual way was conveyed to gasometers, each containing five litres, from whence it was immediately put into a gas vessel with a stop-cock to be ready for burning. By means of this preparation the quantity of the gases at the different stages of the distillation could be judged of. I have obtained from one kilogramme of this coal:

Gas of good quality, producing a clear and brilliant flame	160 lit.
Gas of a bad quality, producing a red flame, without brightness	92
	252 lit.

"Of this only 160 could have been employed for lighting; so that the distillation should have been stopped before they were produced. I think that in every gas manufactory practice should have taught them the most favorable time for recharging the retorts. I obtained as a residue from this operation 632 grammes of coke. After having dried the same coal, I obtained from each kilogramme:

Gas of good quality................	240 lit.
Gas of bad quality	92
	332 lit.

"Therefore it is perceived that coal containing 10 per cent. of water produced only 160 litres, or 4.67 cubic feet of gas of good quality, the kilogramme; and that the same quantity of coal dried produced 240 litres, or seven cubic feet, precisely half more. I have obtained by this operation 668 grammes of coke, a rather smaller proportion than was obtained with the wet coal, if the quantity of the distilled coal is alone taken into consideration. In fact the quantity of coke will be less, if the proportion of gas extracted is greater. Finally, the process of distillation was shorter with the dry coal than with the other, so that there will be an economy of time as well as of fuel by using it when previously dried.

"The very great difference that I have found between the produce of dry coal and coal that has been wet may in my opinion be attributed to there being at the commencement of the operation a great part of the heat employed in evaporating the water. The temperature of the retort is then not so high, and a considerable quantity of bitumen is distilled without being decomposed. I have remarked, also, that in this case a longer time elapses before any great quantity of the gas comes over, and have already stated that the whole of the operation was longer. Perhaps the difference would not exist in the same degree when carried on on a large scale, when the retorts are refilled while they continue hot; but I am convinced a very decided advantage would be the consequence of drying the coal before it is used. Besides, nothing could be easier than to effect this without expense, since nothing more would be required than to spread, before the furnaces, the coal that would be wanted on the ensuing day.

"To obtain a large volume of gas is not all that is required; regard must also be paid to its quality. It is not in fact to receive a determinate quantity of bicarburet of hydrogen that consumers require; but to be able to procure as great a volume of light as they want. It is to effect this that every one, more or less, opens the stop-cocks of his gas burners, in order to obtain an equal proportion of light. Thus what is wanting in quality is supplied by additional volume. Gas manufacturers would then be mistaken if they calculated only on the quantity daily produced. It is requisite to take into consideration also the quantity of light which it will produce in comparison with that of lamps."

APPLICATION OF FANNERS TO BLAST FURNACES.

The following remarks on the attempted application of fanners in blast furnaces are translated from *L'Ancre*, a paper devoted to metallurgy; the writer is M. Denizet, sen.:—"A journal recently announced that M. Fairbaix, an engineer and machinist at Manchester, had proposed to the masters of the English forges to superintend some experiments on the efficacy of fanners for the fusion of ores of iron in blast furnaces.

"We know that fanners have been used for a considerable time in France and England for smelting cast iron. Nearly all the masters of the forges who had heard of the great advantages resulting from the fanners, did not consider these advantages should be put in competition with the inconveniences attending them. Adopting the opinion of the inventor, M. Fairbaix, they believed that the efficacy of this inflating machine consisted in the quantity of air that it supplied, and not in the force of that air. Now as the temperature can only be increased according to the pressure by which the air is forced out, it follows that it is not necessary to force out a great deal of air, but to force it out quickly, under a given pressure. The result, then, is that not only do these fanners consume as much coal as other inflators, but they require, all other things being equal, a much greater power to keep them in motion, they are in constant need of repair, and, besides this, they require a large supply of oil. Thus we are now convinced that all masters of forges who have made use of ventilators, and have continued to use them for some time as a satisfaction to their *amour propre*, are well pleased at last to lay aside a machine which was attended with great expense, and which in our opinion was a very useless one.

"We do not contest the point that fanners possess the power of smelting iron, but we boldly contest their power of reducing the metal from the crude ore.

"Not only would the fanners require considerably more moving power and much more keeping in repair, they would consume a great deal of fuel; but the temperature would not be sufficiently high to reduce ores that were refractory. If pressure were not required to raise the heat of the hearth by means of blasts of air, it would be still more useless to have recourse to ventilators whose duration is merely momentary. By enlarging the opening of the tuyeres of the old inflators, by diminishing their volume while increasing their capacity, the expense of the moving power and the repairs would be diminished.

"We are then able to predict, notwithstanding the flattering reports made by the journals, that the application of fanners to blast or reverberating furnaces will be attended with the same unsuccessful

results as a similar application to other furnaces was. We shall consequently see the fanners exclusively appropriated in the granaries of agriculturists, and used to separate the chaff and the dust from the grain. Applied in this manner, the simplicity of the machine has caused it to be almost generally adopted, and the good sense of our agriculturists has given it so favorable a reception that no ono has yet complained of any inconvenience arising from its use. But its application to furnaces requiring forced currents of air has, in our opinion, always been an error that would be removed by the most simple notion of mechanical and chemical science."

EXPERIMENTS ON THE BIRMINGHAM AND GLOUCESTER RAILWAY INCLINE.

The following letter from Capt. W. S. Moorsom, engineer in chief of the Birmingham and Gloucester Railway, with accompanying experiments, are from the *Railway Magazine*. There are some parts of Captain Morsom's letter which, if proceeding from less authority, we should be much disposed to question.

The results of the experiments, it will be observed, are very various, without any apparent adequate cause. This affords an additional proof of the questionable nature of all railway experiments, unless every particular of the working of the engine, the state of the road, the consumption of fuel, &c., be minutely and accurately given.

"I now send you two papers—not culled, but casually taken from a month's trial papers of each of the engines which were tried before running trains on the Birmingham and Gloucester plane of 1 in 37. The 'Philadelphia' was placed on the plane before the way was laid on the lower part, which accounts for the shortness of the trips. So much therefore for the trials. Secondly, as to daily work—the custom is that the bank engine ('Philadelphia' or 'Boston,' whichever is for service that day) hooks on as soon as the train arrives at Bromsgrove station, and assists the train engine up the plane, as all other assistant engines do, on other lines, except that she goes ahead, and when arrived at the top throws off, by means of a fall-down catch, and runs into a siding to let the train pass without the latter stopping at all.

"The summary of the daily returns made to me for the winter quarter * (and I can if you desire it supply you with the details), shows 338 engines, assisted each by the bank engine, conveying 338 trains consisting of 1,371 coaches and 615 wagons (our trains are always mixed), carried up tho plane in 3,332 minutes, which gives an average of 4 coaches and 2 wagons to each train, carried up 2 miles 1-10th, at 1 in 37·4, in the average time of $9\frac{3}{4}$ minutes from the moment of starting at Bromsgrove station.

"The maximum time of any train was 17 minutes, and this was owing to a stoppage on the plane to re-couple a fastening,—the next longest was 15 minutes, and the shortest was 7 minutes.

"It has been chiefly in the course of my own practice on the plane that I fancied your notions were well exemplified as to atmospheric resistance. I have on more than one occasion come down the plane with carriages alone, without any break, until we got towards the lower part where the wind has less effect. Again, the break or breaks, (one is often sufficient for a passenger train), if carefully applied to the proper degree or tension or thrust, may be there left, and not touched until the descent to a different resisting medium renders another turn of the break needful.

"This I have often tried with wagons as well as coaches.

"I should feel pleasure, if there are any points of inquiry which you wish to elucidate practically, if I can be of service in showing you the plane and procuring the means of any trials. I think a field of vast importance for the railway interest is comprised in the question—What are the steepest planes that we can safely and economically work with locomotive engines? In Cornwall any low gradients could not be made, on account of the expense, for perhaps half a century, but with high gradients an excellent line (for that country) may be very cheaply made. I am, your faithful,

Bodmin, Cornwall, W. S. Moorsom."
4th Feb. 1841.

* Date of returns commences 17th of October, and ends 16th of January.

"TRIALS OF THE 'PHILADELPHIA' ON THE LICKEY INCLINE, (HAULING LOADED WAGONS), 20TH JULY, 1840.

"Note.—The *Philadelphia* weighs, including coke aud water, 12 tons 3 cwt., and has 4 feet wheels, 20 inch stroke, and $12\frac{1}{2}$ inch cylinders. The pressure of steam in the boiler during the following trials varied from 55 to 62lbs per square inch. The engine has a "bogie frame" in front. The incline is laid out at 1 in $37\frac{1}{2}$, but, owing to being very lately made, some parts are graduated at 1 in 34, and others at 1 in 40; the start was made immediately at the foot, upon a temporary level, 60 yards long.

"FIRST TRIP.

No. of Post.	Time of passing each Post.			Distance between Posts.	Time between Posts.		Rate per Hour.
	Hrs.	Min.	Sec.	Chains.	Min.	Sec.	Miles.
1	5	48	15	..	....		....
2	0	49	0	10	0	45	10.00
3	0	49	31	10	0	32	14 06
4	0	50	1	10	0	30	15.00
5	0	50	32	10	0	31	14.51
6	0	51	2	10	0	30	15.00
7	0	51	30	10	0	28	16.06
8	0	51	56	10	0	26	17.30
9	0	52	9	5	0	13	17.30
				75	3	54	

"Remarks.—Load 5 wagons, $32\frac{1}{2}$ tons; men $1\frac{1}{2}$ tons; engine and tender, 19 tons.—Total, 53 tons.

"Note.—In order to wet the rails, water was sprinked upon them from a water-tub in front of the engine, and when the wheels slipped, sand was let on from the sand box, which this engine always carries.

"SECOND TRIP.

1	6	0	10	..	....		....
2	0	0	54	10	0	44	10.22
3	0	1	32	10	0	38	11.84
4	0	2	10	10	0	38	11.84
5	0	2	40	10	0	30	15.00
6	0	3	10	10	0	30	15.00
7	0	3	40	10	0	30	15.00
8	0	4	12	10	0	32	14.06
9	0	4	29	5	0	17	13.23
				75	4	19	

"Remarks.—Same load.

"THIRD TRIP.

1	6	19	58	..	....		....
2	0	20	51	10	0	53	8.49
3	0	21	32	10	0	41	10.97
4	0	22	10	10	0	38	11.84
5	0	22	46	10	0	36	12.50
6	0	23	22	10	0	36	12.50
7	0	23	55	10	0	33	13.63
8	0	24	30	15	0	35	12.85
9	0	24	47	5	0	17	13.23
				75	4	49	

"Remarks.—Same load.

"FOURTH TRIP.

1	6	33	5	..	....		....
2	0	33	52	10	0	47	9.60
3	0	34	32	10	0	40	11.25
4	0	35	8	10	0	36	12.50
5	0	35	34	10	0	36	12.50
6	0	36	18	10	0	34	13.23
7	0	36	52	10	0	34	13.23
8	0	37	26	10	0	34	13.23
9	0	37	43	5	0	17	13.23
				75	4	38	

"Remarks.—Same load.

"FIFTH TRIP.

No. of Post.	Time of passing each Post.			Distance between Posts.	Time between Posts.		Rate per Hour.
	Hrs.	Mins.	Sec.	Chains.	Min.	Sec.	Miles.
*1	6	45	18	..	....		....
2	0	46	20	10	1	2	7.25
3	0	47	19	10	0	59	7.62
4	0	48	59	10	0	40	11.25
5	0	49	37	10	0	38	11.84
6	0	50	15	10	0	38	11.84
7	0	51	51	10	0	36	12.50
8	0	52	26	10	0	35	12.85
9	0	52	44	5	0	18	12.50
				75	7	26	

"Remarks.—Same load.
* Steam not blowing off.

"TRIALS OF THE 'BOSTON' ON THE LICKEY INCLINE, (HAULING LOADED WAGONS), COMMENCING 16TH SEPTEMBER, 1840.

"The *Boston* is precisely the same model as the *Philadelphia* (which see described in her trial notes), namely, $12\frac{1}{2}$ inch cylinders, 20 inch stroke, and 4 feet wheels, not coupled, and with bogie frame in front. Weight loaded, 12 tons 3 cwt.

"FIRST TRIP, SEPT. 16TH.

No. of Post.	Distance between Posts.	Time between Posts.		Rate per Hour.	
	Chains.	Min.	Sec.	Mls.	Chs.
1	3	0	24	5	16
2	10	1	50	4	8
3	10	1	41	4	39
4	10	1	15	5	63
5	10	1	15	5	63
6	10	1	0	7	40
7	10	0	59	7	50
8	10	0	57	7	73
9	10	0	57	7	73
10	10	0	57	7	73
11	10	0	59	7	50
12	10	1	3	7	0
13	10	0	58	7	60
14	10	1	0	7	40
15	10	1	1	7	29
16	10	1	1	7	29
17	10	1	4	7	2
	163	18	21	6	45

"Remarks.—Five wagons loaded with 4 tons of sand each, and 16 men; gross load, 36 tons; add engine and tender, 19 tons, total, 55 tons. Rails half dry and dirty, a damp day.

"Load.—18 men. Total, 36 tons, exclusive of engine and tender.

"SECOND TRIP.

1	3	0	14	9	52
2	10	1	5	6	73
3	10	1	5	6	73
4	10	1	2	7	20
5	10	1	0	7	40
6	10	0	55	8	16
7	10	0	54	8	26
8	10	0	54	8	26
9	10	0	54	8	26
10	10	0	54	8	26
11	10	0	50	9	0
12	10	0	58	7	60
13	10	0	53	8	39
14	10	0	54	8	26
15	10	0	53	8	39
16	10	0	50	9	0
17	10	0	49	9	14
	163	15	4	7	75

"Remarks.—Index 20 (off strong).

"Note.—The 'Index 20' answers to a pressure of 57 lbs. per square inch on the boiler.

"Load.—Same, and 15 men. Total, 36 tons, exclusive of engine and tender.

"THIRD TRIP.

No. of Post.	Distance between Posts.	Time between Posts.		Rate per Hour.	
	Chains.	Min.	Sec.	Mls.	Chs.
1	3	0	20	6	65
2	10	1	5	6	73
3	10	1	6	6	65
4	10	1	0	7	40
5	10	0	59	7	50
6	10	1	1	7	29
7	10	1	0	7	40
8	10	0	53	8	39
9	10	0	57	7	73
10	10	0	56	8	2
11	10	0	54	8	26
12	10	0	56	8	2
13	10	0	51	8	65
14	10	0	55	8	16
15	10	0	52	8	52
16	10	0	53	8	39
17	10	0	49	9	14
	163	15	27	7	55

"Remarks.—Rails just dry and dirty—a damp day. Index 20 (off strong).

"Load.—Same. Total, 36 tons, exclusive of engine and tender.

"FOURTH TRIP.

1	3	0	18	7	50
2	10	1	3	7	10
3	10	1	1	7	29
4	10	1	1	7	29
5	10	0	53	8	39
6	10	0	52	8	52
7	10	0	53	8	39
8	10	0	52	8	52
9	10	0	49	9	14
10	10	0	51	8	65
11	10	0	48	9	32
12	10	0	49	9	14
13	10	0	49	9	14
14	10	0	50	9	0
15	10	0	49	9	14
16	10	0	49	9	14
17	10	0	49	9	14
	163	14	7	8	32

"Remarks.—Index, 20 (off). Rails more dry.

"Load.—Same. 26 men. Total, 36¾ tons, exclusive of engine and tender.

"FIFTH TRIP.

1	3	0	18	7	40
2	10	1	12	6	20
3	10	1	8	6	49
4	10	0	53	8	39
5	10	0	51	8	65
6	10	0	50	9	0
7	10	0	47	9	46
8	10	0	46	9	61
9	10	0	49	9	14
10	10	0	56	8	2
11	10	0	53	8	39
12	10	0	52	8	52
13	10	0	52	8	52
14	10	0	51	8	65
15	10	0	52	8	52
16	10	0	52	8	52
17	10	0	53	8	39
	163	14	35	8	27

"Remarks.—Rails dry. Index 20 (off).

"Load.—Same, and 29 passengers. Total, 37 tons behind tender."

EVAPORATIVE POWER OF COAL.

Dr. Andrew Fyfe, President of the Society of Arts for Scotland, read a paper before the Society, on the 8th February last, "On the Evaporative Power of different kinds of Coal," which was ordered to be printed among the transactions of the Society.

The paper is too long to be given entire, we purpose, therefore, to give an abstract, comprising its more new and important features.

"Very different opinions have been, and are still, entertained regarding the source of heat during combustion, and of the power of different inflammables for evolving heat. The recent experiments of Despretz on this subject are, perhaps, the most important, as tending to the deduction of a law by which, if correct, we shall be enabled to calculate with accuracy the amount of heat evolved by different combustibles. From his numerous experiments, Despretz has drawn the conclusion, that the heat disengaged during combustion is in proportion to the quantity of oxygen with which the combustible unites. Thus applying this rule to hydrogen, carbon, alcohol, and ether, and taking the quantity of water raised from 32° to 212° as the means of measuring the comparative amount of heat disengaged, he found, by experiment, that the quantity of water brought to the boiling point by the union of—

1 lb. of oxygen with hydrogen, was.. 29½ lb.
„ with carbon .... 29 „
„ with ether .... 28½ „
„ with alcohol .... 28 „

results so very nearly agreeing with each other, that, keeping in view tho unavoidable sources of error in all experiments of this kind, we may consider the quantity the same in all. The average of the above trials is 28¾. Hence, when one pound of oxygen enters into union with any inflammable, heat is evolved, which, according to Despretz, is sufficient to raise 28¾ lbs. of water from the freezing to the boiling point. It may be stated in round numbers as 29 lbs. We have thus, then, a method of procuring a standard for the amount of heat disengaged during combustion. Thus 1 of carbon unites with 2·66 of oxygen, and $2{\cdot}66 \times 29 = 77{\cdot}14$, so that, by this process of calculation, 1 lb. of carbon ought to raise 77·14 lbs. of water from 32° to 212°. This is rather below what is stated by Despretz. He has fixed it at 78·15.

"Different statements have been given of the quantity of caloric received by water during its conversion into steam; in other words, of the latent heat of steam. If we suppose, as has been stated by Lardner and others, that it requires five and a half times as long to evaporate water that it does to raise it from the freezing to the boiling point, then the latent heat will amount to 990. But others have made it lower than this. According to Despretz it is only 955·8. Assuming this as correct, then in steam the total number of degrees of temperature beyond 32 is $(180+955{\cdot}8)$ 1135·8—say 1136. Hence, if 1 lb. of carbon will raise 78·15 lbs., as stated by Despretz, from 32 to 212, it will evaporate 12·3 lbs. from 32—and this is the quantity fixed on by him.

"It is well known that the different substances used as fuel consist, in their original state, chiefly of carbon and of hydrogen; in addition to which there is generally a minute quantity of oxygen and of nitrogen, and there is always a portion of earthy and metallic matter, constituting the ashes. The only one of these which, in addition to the carbon, will evolve heat during the combustion, is the hydrogen. Now, one of hydrogen combines with eight of oxygen, or exactly three times as much as carbon requires; 1 lb. of hydrogen will, therefore, evaporate 37 lbs. of water from 32.

"It is evident from this, that if we know the composition of the fuel, we can calculate the evaporative power by knowing the quantity of oxygen necessary for converting the carbon and nitrogen into carbonic acid and water. Of course, the greater the proportion of hydrogen, the greater ought the evaporative power to be. If the fuel contain nitrogen, a part of the hydrogen must be deducted from the whole quantity, because the nitrogen will unite with it to form ammonia; and, again, if oxygen exist in the fuel, the hydrogen which is requisite to convert that oxygen into water must also be deducted, and, accordingly, in addition to the carbon, it is only the hydrogen over and above what is required for uniting with the nitrogen and oxygen that are to evolve heat by the combustion.

"The most recent account of the analysis of various kinds of coal, is that published by Mr. Richardson, in the *Trans. of the Nat. History Society of Newcastle*, and also in the *Lond. and Ed. Phil. Mag.*, for August, 1838. From his experiments he has given the composition of the coal, and the quantity of oxygen necessary for the combustion. The following table shows the results, dividing the coals into four classes, as mentioned by Dr. Thomson:—

Coal.	Locality.	Carbon.	Hydrogen.	Oxygen and Azote.	Ashes.	Oxygen required for combustion of 100 parts.	Heat evolved by the same weight. Ed. 100.	Heat given out by same vol., Ed. 100.
Cannel ..	Edinburgh	67·597	5·405	12·432	14·566	217·6	100·	100·
—	Lancashire	83·573	5·660	8·039	2·548	256·6	117·83	117·91
Splint ..	Wylam ..	74·823	6·180	5·085	13·712	240·1	110·34	108·99
—	Glasgow ..	82·724	5·491	10·457	1·128	250·5	115·12	114·15
Cherry ..	Newcastle...	84·846	5·048	8·430	1·676	253·9	116·68	112·07
—	Glasgow ..	81·204	5·452	11·923	1·421	244·0	112·12	107·78
Caking ..	Newcastle...	87·952	5·239	5·416	1·393	266·7	122·56	119·03
—	Durham ..	83·274	5·171	9·036	2·519	250·2	114·98	111·31

"From this table it appears that there is not much difference in the heat evolved by the perfect combustion of the varieties of coal mentioned; assuming that the heat is in the ratio of the oxygen consumed, thus leaving out the cannel coal, which is not used for steam engines, and also the Wylam, which is not now in the market, the extremes are 122·56 and 112·12; that is, as 100 to 109·3. Or, taking the average of the two samples of Scotch coal and that of the English, it is as 100 and 109·6. These numbers may, therefore, be considered as representing—the former the Scotch and the latter the English—caking coal."

Dr. Fyfe, after referring to the method proposed by Berthier of ascertaining the quantity of oxygen containing inflammable matter by the decomposition of metallic oxides, observes, that, after all, the best practical means of ascertaining the available heat obtainable from coal, is by actual combustion in properly-constructed furnaces. He then gives the results of some experiments made on a large scale, with a view to determine the comparative practical evaporating power of anthracite and of Scotch coal. The experiments were conducted on Mr. Bell's patent apparatus for increasing the heating surface. We copy the report of the experiments with Scotch coal and the comments of Dr. Fyfe, reserving the remainder of his communication for a subsequent week.

"*Scotch Coal.*—I conceive it unnecessary to give the result of the numerous trials made with this fuel. They, in general, come very near to each other. I give the particulars of one only,

which was conducted with great care, and in the result of which the utmost confidence may be placed. The coal used was from Middlerig, and is considered of good quality:

Time. H.	M.	Fuel. lbs.	Water evaporated in gallons.	Temp. of air thrown into ash-pit.	Cinders in ash-pit. lbs.
10	35	—	—	——	—
11	35	112	64	415 at 11	—
11	35	—	—	——	—
12	55	112	68	——	—
12	55	—	—	——	—
2	—	112	68	410 at 1·30	—
2	—	—	—	——	—
3	5	112	68	——	—
3	5	—	—	350 at 3·30	—
4	25	112	80	——	—
4	25	—	—	——	—
5	25	112	68	——	—
5	25	—	—	——	—
7	35	112	72	300 at 6·15	—
9	—	784	488	——	52

"In this trial the furnace was supplied with the cwt. of coal at three differeut stokings. The pressure on the boiler was 17 lbs. beyond the atmospheric pressure.

"The above table shows that 784 lbs. of fuel were used, aud that 488 gallons—that is, 4,880 lbs. of water—were evaporated from the temperature 45°, thus giving a result of 6·22 lbs. for each pound of coal, at 17 lbs. pressure.

"On subjecting the coal used in this trial to analysis, I found it to consist of—

Moisture	7.5
Volatile matter	34·5
Fixed carbon	50·5
Ashes	7·5—100·0

"I may here also state the result of another trial made with a Scotch coal got from a different place, and with another furnace, not fitted with the hot-air apparatus. It was one attached to a ten-horse high pressure engine. This trial was conducted in the same way as the former, and nearly at the same pressure—due attention being paid to the weighing of the fuel, the state of the fire at the commencement and termination, and also to the height of the water in the boiler, which was ascertained also by a float and index. Without giving the particulars, I may merely mention, that the trial lasted from eleven till four o'clock. The total quantity of coal used was 540 lbs., and the total amount of evaporation was 3,580 lbs., thus making the result 6·62 lbs. for each pound of coal used.

"In the former trial the water supplied to the boiler was at 45°, in the latter the return water from the boiler was thrown into the supply tank, and hence the temperature was higher. It was found on an average to be at 170°, which will so far account for the greater amount of evaporation.

"In the table given by Richardson, the quantity of oxygen necessary for the combustion of the specimens of Scotch coal analysed, is 247, which would make the evaporative power 11·3, compared to that of pure carbon as 12·3. By the test with litharge, as proposed by Berthier, I found that the greatest quantity of oxygen required for the combustion of the fuel with which the first trial above given was made, was 205, which would make its evaporative power 9·48. But by the furnace trial only 6·22 were evaporated.

"Now, $9·48—6·22 = 3·26$ and $9·48 : 3·26 :: 100 : 34·38$, without taking into account the slight difference in temperature between 32° and 45°, there was, therefore, a loss of 34·38 per cent. of the heat supposed to be evolved, provided the whole of the fuel was consumed; but in this trial the cinders in the ash-pit amounted to 52 lbs., and deducting this from the fuel used, there were only 732 lbs. actually consumed, which would make the evaporation amount to 6·66, and $9·48 — 6·66 = 2·82$, and $9·48 : 2·82 :: 100 : 28·97$ —thus giving a loss of 28·97 per cent. of the heat evolved, supposing 732 lbs. of coal had undergone complete combustion.

"I am aware that it may be objected to this trial, that as the loss is so great, the furnace must have been very defective in its construction. I may here state, however, that, with the exception of a slight deficiency in draught, the furnace, which had from the commencement of the experiment undergone numerous alterations and improvements, was considered by competent judges as built on the most approved principles; but though there is a vast loss of heat in this instance, we shall find that the result so far from being a bad one, is rather beyond what has been stated by others. When coal is used for steam-engines, of course the quantity used must depend very much on the power of the engine, its construction, and the use to which it is applied. It has been stated, that, taking the average of many trials, from 10 lbs. to 15 lbs. of coal are required for each horse power. Now, it is generally allowed that, for each horse power, a cubic foot of water must be passed off in steam, the weight of which is 6·22 lbs. Accordingly, taking the smallest quantity above given, then each pound of fuel will evaporate 6·22 of water. It must be allowed that the mode of testing the power of a coal by the quantity used in reference to the power of the engine, is a very fallacious one; at the same time, however, as what I have stated is a practical result, deduced from numerous trials, I bring it forward to show, that that obtained in my experiment is not, as some may at first sight be inclined to suppose it, below what usually occurs."

ALLEGED INFRINGEMENT OF A PATENT.

In the Court of Common Pleas on Monday, a rule for a new trial was moved and granted in the case of *Walton v. Potter and another*, for the infringement of a patent, which was tried before Lord Chief Justice Tindal last term. The patent was described by the plaintiff in his specification as consisting in an improvement of cards for carding cotton, silk, wool, and other fibrous substances, and for raising the pile of woollen cloths by the substitution of a cut or sliver of india-rubber for the base of the card, instead of leather, which had been previously used for that purpose. A report of the case will be found in *The Inventors' Advocate* of Feb. 13. The jury found a verdict for the plaintiff upon all the issues, and Mr. Serjeant Channell on Monday last, moved for a rule to show cause why this verdict should not be set aside, and a verdict entered for the defendants instead, pursuant to leave reserved; and why a new trial should not be had on the ground of misdirection, and also of the verdict being against evidence.

PATENTS.—BRITISH AND FOREIGN.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 245.)

CHARLES PAYNE, of South Lambeth, Surrey, gent., for *improvements in salting animal matters*, April 13.—Claim.—The mode of salting animal matters (preserved or cured by salt), by causing the brine to penetrate into such animal matters by pressure, or pressure and vacuum, when such matters are contained in a suitably-closed vessel.

This invention of improvements in salting animal matters consists in subjecting such matters to pressure, or pressure and vacuum. The construction of the apparatus for effecting this is very simple, being on the principle of the ordinary air-pump used for pneumatic experiments, with the addition of a force pump for supplying the brine. The vessel for containing the meat is made of iron of a size suited to the quantity of meat it is required to contain, and of a strength sufficient to withstand the necessary pressure; the meat being placed in this, is kept from floating in the brine by a false cover; the real cover is now fastened on air-tight.

The inside of the vessel is now brought to as near a perfect vacuum as possible by means of the air-pump, and then half filled with brine; the air-pump is then again worked, and the brine allowed to flow into the vessel until it covers the meat, then again the air pump is worked, and the brine allowed to flow in until the vessel is full. The force-pump is now set to work to pump in the brine, until it raises a safety-valve loaded to from one hundred to one hundred and fifty pounds per inch; the apparatus is now allowed to remain from fifteen minutes to an hour, when the meat will be found perfectly salted.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page* 245.)

HENRY PINKUS, Esq., 36, Maddox-street, Regent-street, Middlesex, for *an improved method of combining and applying materials applicable to the formation or construction of roads or ways*, April 15.—This invention consists in methods of combining materials so as to form foundations of superstructures of roads, ways, streets, or rail or tram ways, and applying fixtures to the said combination so as to suit to the impelling of common or improved vehicles thereon.

A foundation is first laid of close-set rubble stones, with the broad faces down and their pointed ends up, being from seven to twelve inches high in the middle of the road, and gradually diminishing in height towards the sides. The interstices between the stones are filled up compactly with chips of broken stone, and the surface then rammed or rolled. On this, in parallel lines, all along the said road or street, are laid buttress-sleepers, which constitute abutments of arches of short span, by which the road or street is divided transversely; the parallelism of the buttress-sleepers can be maintained on loose soils by means of transomes or ties.

In lieu of the said rubble foundation, a foundation may be formed of broken stones, about four or five inches in depth, or in place of the foundation of broken stones a foundation may be formed of rough bricks.

On foundations so formed, a superstructure of wood or stone blocks is laid, the blocks being either conical, or blocks of a stromboidal form. They are formed into "textile or woven masses" in the following manner:—In one or more sides of the blocks near their middle part circular or angular grooves are formed, in a line with the upper face of the blocks, and the blocks are laid on the foundation in such a manner that when a series of grooves are laid, face to face, they form long grooves, into which long rods of the form of the grooves are inserted. The grooves and rods are so laid down that one series of rods is at right angles with the line of the road, and another set in a line with the road, except when the blocks are laid diagonally with the line of road; in that case the rods will cross one another at right angles, and diagonally with the line of road.

In order to prevent horses from slipping on this pavement, a circular indent is formed in the vertical face of each block, which indent is filled flush with the face of the block with a composition, such as any of the asphaltums mixed with coarse gravel, or a hard burnt tile is inserted in the vertical face of each block.

The patentee shows an improvement in railways, in order to facilitate the impelling of trains up ascending planes, consisting of a centre rail, which is embraced by two bevel wheels of an adhesion apparatus attached to the locomotive engine.

The patentee likewise combines with the railway self-acting or self-regulating indicators, for marking the times of arrivals and departures of carriages or trains at and from stations, by applying, as fixtures, at or near the stations, stamping or printing apparatus, and applying to locomotive engines or carriages an index or indices, which unite at the stations with the indicators, for the purpose of stamping or printing the times of arrivals or departures of trains.

ENTERED AT THE PETTY BAG OFFICE.

(Continued from page 246.)

WILLIAM NEWTON, of the Office for Patents, 66, Chancery-lane, Middlesex, civil engineer, for *certain improvements in engines to be worked by air or other gases* (being a communication), April 15.—The generator or outer cylinder of the engine is formed of thin sheet metal, and to the upper part of it is attached a stuffing-box of cast-iron, on the top of which is a copper cup for containing water, and beneath the stuffing-box on the generator are two other cups, also for containing water; under the bottom of the generator is a furnace for heating the same.

The piston is a thin cylinder of copper at the top of which is a ring, and to this ring is attached a hollow frustrum of a cone, with its apex downwards, which cone is kept full of water.

The plunger or inner cylinder is composed of two parts, the lower part being cylindrical, and formed with a hollow cone, so as to fit the cone of the piston.

The action of the engine is as follows:—As soon as the piston has attained the lowest point of its stroke, the plunger is caused to rise, and the air which was contained in the space between the lower part of the piston and the upper part of the plunger is by that means made to descend into the lower part of the generator, where, being expanded by the heat, it forces up the plunger higher, and continuing to expand, at last forces the piston and plunger to the highest point of the upward stroke; the plunger now descends, and forces the expanded air up into the space between its upper part and the lower part of the piston, where by means of the water contained in the cups it is cooled and contracted, and again forced to the lower part of the generator as before.

The patentee shows a modification of the above, in which the air is cooled by the injection of water in the form of rain.

ROBERT PETTIT, of Wood-house-place, Stepney-green, Middlesex, gentleman, for *improvements in railroads, and in the carriages and wheels employed thereon*, April 15.—Claim first.—The improved construction and arrangement of railways.

Claim second.—The improvements relating to the construction of the carriages and the apparatus attached thereto.

Claim third.—The combination or arrangement for arresting the progress of trains on railways.

The rails for the construction of railways are of various forms, one of which is a flat bar of iron, on which the wheels run divested of their flanges, the carriages being kept on the rails by four or more horizontal wheels, fastened to vertical shafts under the carriages, which run in contact with a centre rail; the horizontal wheels are also used without the centre rail, by causing them to run in contact with the inside of the parallel rails, one form of which rails is provided with a top flange, in order to prevent the horizontal wheels from rising above the said rails. When the first form of rails is made use of, the centre rail is used instead of switches; a portion of it where the rails diverge turning on a pivot at one end, the other end is moved by a connecting-rod and lever in the same manner as switches, and the horizontal wheels following the direction of the centre rail will guide the carriages into the right line of rails.

One of the improvements in retarding railway carriages consists in a horizontal shaft at the top of the carriage, attached at each end to the upper end of a rocking lever, and also attached to two connecting-rods, to the other ends of which are fastened the upper ends of two other rocking-levers; to the lower ends of each of these levers a break is fastened, and another break is attached to each of them by a connecting link; there is also another break, placed above the anti-friction roller with which the wheel is provided. When it is desired to retard the progress of the train, the horizontal axis is moved by a screw, and the rocking-levers are thus caused to apply the breaks attached to them, at the same time by their moving they force back a bar attached to each of the upper breaks, and so bring those into action.

Another improvement in retarding railway trains, and in the construction of railway carriages, is as follows:—To the back part of the engine is attached a vertical shaft, provided with a handle, which extends out beyond the side of the engine; on this shaft is a pulley, to which two cords are fastened, one of which is attached to the steam-whistle and steam-cock, and the other is attached to a pin. The handle of the vertical shaft is acted upon by a double inclined plane, placed on the top of a pillar (there being one at every place where it is desired the trains should stop), which plane can be moved to and fro on the top of the same, and is secured in its place by a screw. The mode of acting is as follows:—The double inclined plane is brought forward on the top of the pillar at the station where it is desired the train should stop, then, as the engine advances, the handle of the vertical shaft comes in contact with the plane, and is forced back, by which means the vertical shaft will be turned partly round, and the cords partly wound upon the pulley; the cords being thus drawn back, one of them will, by turning the steam-cock, shut off the steam from both cylinders, and turn it into the whistle, whilst the other will draw the pin out of the place in which it was inserted, and thus release a cord attached to a pair of folding doors in front of the engine, which being left at liberty will fly open, and thus offer a larger surface to the resistance of the atmosphere.

This being done, nothing more is required than to check the momentum of the train, which is effected by the following:—From the top of every alternate carriage one end of a lever extends, in the same manner as the handle of the vertical shaft above mentioned, on the other end of this lever a pin is formed, which, entering in an opening in a hooked bar extending across the top of the carriage, keeps the same in a proper position; each end of this bar supports the long ends of two levers, to the short ends of which pendant rods are attached, and to each rod, beneath the anti-friction roller mentioned above, is fastened a break. On the end of the lever coming in contact with the double inclined plane, it withdraws the pin out of the hooked bar, which then descends a short distance, leaving the four levers free, these then by the weight of their longer ends raise their shortest ends, and with them the pendant rods, and thus the breaks are brought in contact with the anti-friction rollers.

The carriages of the improved construction are supported in iron frames, in which the axles of the wheels turn in suitable bearings, and every alternate carriage is supported by the one before and behind it, by means of bars attached to its top, which enter into openings in the framing of the other carriages; it is likewise provided with a pair of rollers, which do not quite touch the rails, but which are intended to support it in case of the bars bending.

The patentee likewise shows a modification of the mode above described for retarding locomotive engines.

The RIGHT HONORABLE FRANCIS EARL OF DUCIE, Woodchester-park, Gloucester, RICHARD CLYBURN, of Uley, engineer, and EDWIN BUDDING, engineer, of Dursley, both in the same county, for *certain improvements in machinery for cutting vegetable and other substances*, April 15.—The patentees claim the application and use of the peculiarly-formed knife or edged tool herein described, for the purpose of cutting or operating upon leather, turnips, mangel-wurzle, tobacco, dye-woods, &c., also the mode of regulating the speed of the feed-rollers of chaff-cutting machines, and likewise the formation of serrated edges on the rotary knife or cutter.

The rotary cutter consists of one or more knives or cutting edges, coiled spirally like the thread of a screw upon a cylinder, or upon a hoop, wheel, or disc, the cutting edges being placed at an angle with the centre of the spiral coil, so that by taking off a portion of their outer edges, bevel knives are formed, which will make a clean cut.

In some instances the under side of the cutting edges are serrated; this is done by grooving them in one direction in the same manner as "float-cut files," then by grinding their upper side a toothed or serrated edge will be formed.

The following is the mode of regulating the speed of the feed-rollers of chaff-cutting machines, to which the rotary cutter has been applied:—In one end of the axis of the rotary cutter is secured a cap, having two worms or screws formed upon it, one being a single-threaded and the other a double-threaded screw; into one or other of these screws a worm-wheel takes, which is fastened to one end of a short shaft, to the other end of which is attached a pinion, taking into another pinion at one end of the lower feeding roller. If it is desired to cut hay or straw, &c., into small pieces, the worm-wheel is caused to take into the single-threaded screw, and the cutter being made to revolve will by means of the worm-wheel and pinions communicate motion to the feeding rollers. If it is desired to cut the hay, &c., into larger pieces, the cap is slidden along the axis of the cutter a short distance, so as to bring the double-threaded screw in contact with the worm-wheel, and is then secured; by this change the feeding rollers will revolve at double their former speed.

JAMES HANCOCK, of Nos. 1 and 2, Sidney-square, Mile-end, Middlesex, civil engineer, for *an improved method of raising water and other fluids*, April 15.—Claim first.—The application to raising water and other fluids of an endless band, whereof one portion is non-absorbent, and the other portion is absorbent of the water and other fluids.

Claim second.—The application to raising water and other fluids of a basis or foundation made as herein described.

Claim third.—The application to raising water and other fluids of sponges, when attached to a basis or foundation, as herein described.

Claim fourth.—The application to raising water and other fluids of a fabric of list or cloth, and tufts of sponge, as herein described.

Claim fifth.—The application to raising water and other fluids of cylinders of net-work, filled with sponge, cork, hair, or wool, as herein described.

Claim sixth.—The application to raising water and other fluids of hemp, hair, pieces of the skins or hides of animals, when attached to a basis or foundation, as herein described.

Claim seventh.—The application to raising water and other fluids of the horsehair or whalebone brush as herein described.

Claim eighth.—The application to raising water and other fluids of net-work, when used as a protection, covering, or security to an absorbing surface, as herein described.

This invention consists in certain applications and arrangements, whereby the method of raising water by an endless rope or band is improved.

The endless band employed is divided into three parts:—First, the non-absorbent part, which the patentee calls the basis or foundation of the band; secondly, the absorbent part or useful elevating portion; and, thirdly, the outer uct or covering, which is used to secure and protect the surface of the absorbent part.

The basis or foundation is made in one of the following ways:—Two pieces of strong woven hempen cloth are selected, or two pieces of any other similar strong fabric, one side of each of the pieces is then "payed" over with the compound solution of caoutchouc herein-after described, and left to dry, until the solution becomes in that particular adhesive state known by the term "tacky;" the pieces are then pressed together evenly by passing them between rollers.

A fabric is also used in the basis or foundation, composed in the warp of iron or other metallic wire, either alone or mixed with split canes, and threads of animal or vegetable material, and in the weft or woop of one or more of the same substances, and this fabric is inserted between the two pieces of cloth before mentioned.

The following is the mode of making the absorbent or elevating portion of the band, and attaching it to the basis or foundation:—One side of the

foundation is covered all over with pieces of sponge, which are made to adhere to it by the compound solution of caoutchouc, the whole is then covered over with net-work, which is sewed or otherwise firmly attached thereto, and a strong cord is sewed diagonally from side to side across the surface.

The absorbing or elevating surface is also formed of a fabric of list or cloth, covered with pieces of sponge; or cylinders of net-work, filled with cork, sponge, hair, or wool; or a hair or whalebone, or a hair and whalebone brush; or of ropes of hemp, hair, or pieces of skins, or hides of animals, prepared or in their natural state.

The compound caoutchouc solution, before patented by the present patentee, is made in the following manner:—Take any quantity of caoutchouc and steep it in coal-tar oil, or oil of turpentine, or a mixture of both sufficient to dissolve it, and when dissolved pass it through an iron strainer; it is then fit for use.

The band prepared in one of the ways above mentioned, and securely joined at the ends, is now to be placed round two drums or rollers, whereof one is at the height or level at which the water or other fluid is to be discharged, and the other is immersed below the surface of the water or other fluid to be raised. The band is then made to move or rotate, by machinery applied to the upper drum or roller in some of the usual manners.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 26th of June.

Charles Winterton Baylis, of Birmingham, accounting-house clerk, due June 16.

George Wildes, of the city of London, merchant, due June 16.

James Davis, of Shoreditch, engineer, due June 16.

John Steward, Esq., of Wolverhampton, due Juue 16.

James Molyneux, of Preston, due June 16.

Hugh Graham, of Bridport-place, Hoxton, artisan, due June 16.

Joseph Beathie, of Portland-place, Wandsworth-road, Lambeth, engineer, due June 16.

Andrew Russ D'Olszowski, of Ashley-crescent, gentleman, due June 16.

William Tudor Mabley, of Wellington-street North, mechanical draftsman, due June 17.

Abraham Alexander Lindo, of Finsbury-circus, gentleman, due June 18.

Elias Robison Hancock, Esq., of Birmingham, due June 18.

SPECIFICATIONS OF AMERICAN PATENTS.

(*From the Journal of the Franklin Institute.*)

Improvements in railway bars; Ed. Tilghman, civil engineer, Philadelphia, Dec. 5, 1840.—"The nature of my improvement is in the so forming the bar that there shall be a reduction of the height usually given to the T rail, between its head, and the base on which it rests, thereby diminishing the leverage of the rail, whilst its strength and its capability of being firmly secured to the cross-tie are provided for by the addition of a rib directly under the centre of the base, which may be made plane, trapezoidical, or with a lower web, as practised in many English edge rails. To fasten this rail I insert the lower rib thereof in gains cut in the cross ties, at the lower part of which gains there is a suitable recess for one side of the lower web; the rail is to be inserted in this gain, and wedged securely in its place, where it will be supported conjointly upon the ordinary base, and upon the under part of the lower web."

The chair referred to consists of a flat plate, which is received into two notches, one in the end of each bar, immediately under its base; the two when put together constituting a mortice that receives said chair, or plate, which is affixed to the cross ties by bolts or spikes.

Machine for separating corroded and uncorroded lead; E. Clark, New York, Dec. 5.—The semi-corroded lead is to be passed between rollers, furnished with grooves, or chequered, so that the uncorroded lead will be stretched, or bent, and again straitened, and thus the corroded parts be separated from that which remains metallic.

The machine is to be put in motion so that each individual roller will turn inward upon its fellow, and downward; and the lead is to pass through between these rollers in a crimped state to the next series, and so on, when it falls upon an endless apron, and is earried away to be again subjected to the corroding process. The claim is to the combination of plain and grooved rollers, and also a revolving apron, brushes, and scrapers, &c.

An improved railroad chair; Britton M. Evans, Pennsylvania, Dec. 27.—This chair is intended to obviate the necessity of wedging the Wigan rail. The chair is to be cast in two parts, one of its sides or cheeks being separate from the other, and being removed to put in the rail; when so placed, the loose cheek is driven in, and the rail thereby confined. The patentee says, "I would have it understood that I am aware that railroad chairs have been made with a moveable jaw, and secured by means of wedges; I do not, therefore, claim that as my invention; but what I do claim as my invention, and desire to secure by letters patent, is the making of the moveable jaw with a dove-tail to fit into a corresponding slide in the chair, and secured by a pin, as described."

An improved spark arrester; Thomas Raeney, Philadelphia, Dec. 28.—This spark arrester operates upon the same principle with that of Mr. Briscoe, but the improvement consists in greatly enlarging the space allowed for the escape of the draught, through inverted cones of wire gauze, or of perforated metal inserted in a cap plate forming the top of the chimney. Mr. Briscoe used but one inverted cone of this kind. The patentee says, that "in apparatus of this kind I have used eight such perforated cones; the centre cone at its upper or open end is eleven inches in diameter, and twenty-one inches deep to its angular point or apex, with seven surrounding cones, eight in diameter at their open ends, and thirteen to their angular points.

"I am aware that the top or covering of a cap, or hood, has been made of wire gauze, in the form of a single inverted cone or curved segment of a hollow sphere; but it is not possible with a single cone to obtain sufficient escape surface for the draught. I do not, therefore, claim the merely giving to the covering of such a cap the form of an inverted cone; but what I do claim is the inserting of a number of such cones of perforated metal or wire gauze into suitable openings in the plate of metal which forms the covering, or top, of such hood or cap, for the purpose of giving sufficient surface for the passage of the draught through the perforations or meshes of such cones. I also claim, in combination with a number of cones arranged and perforated as described, the perforating of the upper sides of the hood, or cap, said perforations being surrounded by a rim retiring from said hood, or cap, and rising up above the upper surface of the top plate thereof, as set forth."

A blowing apparatus for furnaces, &c.; Frederick R. Dimpfel, New York, Dec. 28.—The blowing wheel in this apparatus resembles that in ordinary use, but "between the wind and wheel and the outer case a space is left which may be denominated the air chamber. In this space, as also in and around the wind wheel generally, the air will become condensed by the rapid motion of the wheel, and not being able to escape in consequence of the closure between the collar and the outer case, as described, it may be made to exert a pressure of several pounds to the square inch, by regulating the escape opening." The claims are to "the enclosing of the vanes of the wind wheel with circular sides or rims, between which and the outer case there is a space left, as described; and the attaching a collar to the sides, to admit air to the revolving vanes, the collars being made to run air tight, to prevent the escape of air from the air chamber.

Propelling steam-boats; Benjamin D. Beecher, Connecticut, Dec. 31.—The mode of propelling described by the patentee is intended, principally, for canal boats. "The invention consists in constructing the bow, or fore part of the boat, so as to accommodate the screw or other propellers which I place there, which are intended, by their particular position, and mode of action, to draw the water directly from the bow, and to give it, as it passes towards the stern, such a direction as shall greatly diminish the resistance offered to the passage of the boat." The propelling is to be, in general, effected by means of two spiral or screw wheels, placed immediately in front, so as to exteud completely out to the cutwater; and the claim is to "the manner of locating the two propellers in the bows of the boat, in combination with the manner in which I construct and extend the bottom of the boat forward, and thus causing the propellers to act upon the water in a direction inclined from each other, in a manner and for the purpose set forth."

A machine for manufacturing lead pipes; Joseph C. Vaughan, and Frederick Leach, New York, Dec. 31.—This is a rolling apparatus for rolling pipes of cast lead, so as to reduce them in size. There are four rollers consisting of discs of metal the proper thickness for combining them together, so that they shall, when properly fixed, leave an opening at the place of junction of their peripheries of the size and form of the exterior of the pipe; for this purpose their edges are fluted in such manner as that each constitutes the fourth of a circle. These four rollers are so placed as that they shall each stand at right angles to the two which are next to it, and they meet by a mitre joint at their edges. A vertical core, or mandrel, is fixed to the frame work of the machine, its lower end passing between the rollers. Upon this mandrel the cast lead pipe is to be placed, and the rollers being properly geared, and made to revolve, the pipe will be rolled out to the desired size. The mandrel is to be made hollow, so as to contain oil, a portion of which is allowed to ooze through small openings at its lower end.

FOREIGN INTELLIGENCE.

FRANCE.

The following is an account of the progress made in the building of new steam ships and steam-engines commanded by the state. Eight vessels of 450-horse power were put on the stocks in 1840, preparations are making for the building of four others of 450, and four of 220-horse power. Thus, there remains only two of 450-horse power out of the number ordered to be completed. With respect to the engines, nine of 450-horse, and four of 250 have been ordered to be executed by private individuals; five of 450-horse power will be made at the establishment at Indret. It may be calculated that towards the end of the year 1841 the engines will have advanced five-sixths towards completion, and that they will be finished in 1842. It is probable that some of the vessels will be ready towards the end of 1842, and the whole of them about the middle of 1843.

M. Paul Delaroche is just finishing in the dome of the Amphitheatre of Honor, in the Palace of Fine Arts, the largest picture which has hitherto been

exhibited on that canvas, and which is not less than 70 metres square. This distinguished painter has combined in this work all the great masters of painting and sculpture, from the commencement of these wonderful arts. It is expected that this imposing production will be completed in readiness for the great exhibition of prizes in the month of September.

The commune of Anzim, near Valenciennes, is becoming a most remarkable centre of metallurgical industry. Without alluding to the great manufactory of the mining company, which is spoken of as one of the finest workshops of France, or of that established by M. Carion Delmotte, there are founders of metals, mechanics who are nearly all pupils from the great manufactory, who have made very considerable advances in the manufacture of machinery. A new branch of industry is spoken of which is to be established in the same commune, and which will probably be successful. It is the manufacture of gas apparatus, constructed on so small a scale that all the manufactories will be able to make use of it, by the application of the coal they require, either for heating or for the furnaces of steam-engines.

A letter from Paris gives the following account of a further advance in the application of the electrotype.—"The arts have recently been enriched by a discovery which will be very valuable if it does not disappoint the expectation excited. Submitted to the action of a chemical process, all sorts of objects are covered with a coating of bronze, which reproduces every part, even to the most minute details. Statues of plaster are transformed by means of this process into statues of bronze, in the space of two days, and without any assistance from the hand of the workman. Fruits, leaves, feathers, undergo the same metamorphosis. It is nature taken to the life, it is the Daguerreotype of sculpture. The inventors are M. Ingé and Sayer, two of our most skilful founders. M. Gannal, the embalmer, has made a practical experiment of this process on the animal kingdom. A mutton steak has thus been converted into a steak of bronze. The same might be effected with the human body; and, thanks to this curious invention, a great man after his death may become his own statue."

[We presume it is meant that the body itself cased in a sufficient coat of copper is to be placed on a pedestal.]

BELGIUM.

EXTENSION OF THE BELGIAN RAILROADS T FRANCE.

On the 15th orders were finally given for the completion of the works of the railroad from Mouscron to the French frontier, a distance of not more than half a league. The French government will then not have more than a line of two leagues to construct beyond Lille in order to bring the chief town of the fine department du Nord in close communication with Roubaix, and Turcoing (France), Courtrai, Ghent, Brussels, Antwerp; in fact with the whole of Belgium. The great advantage which Lille will derive from the execution of the works on the French frontier may be judged of from the circumstance that in the short distance of two leagues which separates Lille from the Belgian frontier, there are situated two manufacturing towns of the first importance, and which will now be no more than six minutes journey from Roubaix, and twenty from Turcoing. The distance from Lille to Courtrai will be performed in an hour, reckoning the necessary delay at the custom house; from Lille to Ghent, in two hours; from Lille to Brussels or Antwerp from four to five. So greatly is Lille interested in the extension of our line of railway, that even had it not been undertaken by government, it would have been greatly to her advantage to have commenced the works at her own expense. However it may be, it is probable that the Belgian railroad will have approached France before the latter gives any assistance to the work, so powerful and tenacious are the prejudices of those who in that country neutralise the trading and civilising enterprise of railroads. Mouscron, which will not fail to be comprised in the range of our railroads, contains 5,536 inhabitants. The soil is remarkably fertile there. It contains 23 manufactories of woollen cloth, cotton, thread, &c., 8 cotton twist manufactories, 12 dye-houses, 5 brass foundries, manufactories of snuff, tanneries, brick-kilns, &c. Mouscron also carries on an important trade of colonial produce with France.—*Le Fanal.*

M. Rainbeaux, a Frenchman, intrusted with the management of the valuable and important coal-mines of the Grand-Hornu (Belgium), has for many years made a point of receiving the engineers and pupils from the mining corps, sent into this country for the purpose of scientific investigations, or for completing their studies. He has given them every assistance in these researches and studies; he has allowed them to make use of his instruments, machines, and registers, and he has occasionally permitted them to work in the mines of the Grand-Hornu, where they have gained their experience. These essential services rendered by M. Rainbeaux to industry and science, have attracted the attention of the French government. On the proposal of the Minister of the Public Works, and by the decree of the 4th of April, the King has awarded him the distinction of the Legion of Honor.

At the sitting of the Royal Academy of Sciences and Belles Lettres at Brussels, on the 3d inst., several papers were received on subjects of scientific interest; among the rest was one from M. Crahay, relative to a more effectual construction of galvanic batteries. Several pieces of wood which had been subjected to M. Boucherie's preservative method were presented to the society, and its suitableness for the sleepers on railways, was dwelt upon. M. Nothomb gave some explanation relative to the experiments already made on the railways of the process of Mr. Kyan. The Academy adjourned till the 7th of May.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

EDINBURGH AND GLASGOW RAILWAY.—Mr. Miller, the engineer of that line, intends to open it throughout, from end to end, on 1st August next without fail. In order to expedite the works along the line, the Edinburgh Railway Company some time ago bought a locomotive engine, and gave the use of it to John Gibb and Son, for their extensive contract at the Almond Valley, near Edinburgh. They also bought another locomotive engine from Thomas Edington and Sons, of the Phœnix Iron Works, Glasgow, to be used by Mr. M'Naughtan, contractor, Redding, near Falkirk. These engines will be of immense advantage to the contractors, as they will get the work done faster and much cheaper than by horses, as formerly. The repairing and other stations are also progressing rapidly towards completion, and the whole line of railway is a very animated scene, from the great exertions which are now made to finish it without delay.—*Glasgow Constitutional.*

RAILWAY ACCIDENTS.

FATAL ACCIDENT ON THE MIDLAND COUNTIES RAILWAY.—In the Bail Court, on Wednesday, Sir F. Pollock applied for a *certiorari* to bring up two inquisitions which had been holden before the coroner of the borough of Derby, upon the bodies of two men, named Taylor and Knight, who had both lost their lives by the same accident, which occurred upon the railway in the immediate vicinity of Derby, on the 26th of January last. The object of the application was to cause the inquisition to be quashed for several defects and irregularities which were alleged to appear upon the face of the instrument itself. It appeared that upon the occasion in question one train having been stopped upon the rails, another coming up unexpectedly, the deceased parties were propelled from the moving train against the stationary one, and were so much injured by the shock that they both died very soon after. The jury had in each case found that the engine and tender upon which the deceased parties were placed at the time of the accident was moving to the death, and they awarded a deodand of £300 in each instance. The first objection which the learned counsel took to the inquisition was, that as the accident which caused the deaths of both the deceased parties was one and the same act or circumstance of concussion, the jury had the power to levy only one deodand. They could in any case find only the value of the subject which was moving to the death. But if the course which had been pursued upon the present occasion were admissible, it might happen that twenty persons should be killed by one and the same accident, and that a subject matter which was the cause of the death, and which was worth only £300, might be made the means of charging the owners of it with deodands to twenty times that value. Such a consequence was entirely contradictory to the state of the law, as the party who was liable to the deodand had the power of handing over the matter itself instead of the value which had been fixed upon it by the jury. The learned counsel made several other objections to the instrument, which were all of a more technical character than that already mentioned, except one which proceeded upon the ground that a material part of the inquisition was worded so as to mean, in fact, nothing at all.

The rule was granted.

FOREIGN RAILWAYS.

The total receipts of the Belgian railroads (travellers' baggage, merchandise, and occasional produce), for the month of March 1841, amounted to 445,184 f. 30 c., and for the same month in 1840, to 346,844 f. 37 c.

The *Havre Journal*, in noticing the arrival of wagons and workmen for the Paris and Rouen Railroad in that port, says that the wagons have been hired from the London and Southampton Company at a much lower price than they could possibly have been in France, and that the workmen, who have been sent over, are all chosen from the most sober and laborious of their class that could be found in England. This journal takes the opportunity of pointing out the activity and energy shown by the English engineers, and the Paris and Rouen Company, and holds up their example to the notice of all engaged in France on similar works.

RAILROADS IN GERMANY.—"We are assured," says the *Baden Gazette*, "that the King of Wurtemberg has given his assent to the formation of a railroad from Heilorunn to Friedrichshafen by Ulm, and that the works will be immediately commenced."

RAILROADS IN ITALY.—A Leghorn letter mentions that the Tuscan Government has authorised the formation of a railroad from that city to Florence, passing by Pisa. The works are to be commenced between Leghorn and Pisa. We learn from Venice that the long bridge which is to be constructed across the Lagunes, from the continent to the city, for the passage of the Milan Railroad, will shortly be commenced. This gigantic construction, which will cost 4,830,000 lire (or 3,671,400 francs), is to serve as an aqueduct at the same time, and by this means Venice will be furnished with a constant supply of fresh water.

We quote the following from the *Debats*:—"The Government, we are informed, has received proposals from eminent capitalists, experienced in railroad undertakings, for commencing immediately the line to the Belgian frontier. They are said to have offered to undertake the line as far as Pontoise, engaging not to issue shares till after the expiration of twelve months, in order not to interfere with the Minister of Finance in his negotiations for the intended loan. For the time being

they would not undertake to carry the line beyond Pontoise, but would come to a determination early next session; and in case they refuse to continue the road, the Government would have the right reserved to purchase all their works at cost price whenever it might please, either on its own account, or that of another company. During the last conferences on this subject there is said to have been a serious discussion upon the eligibility of substituting a line to Creil for that to Pontoise. This would double the distance, and make nearly one-fourth of the line between Paris and Lille. The completion of this project, which is evidently advantageous to the state and the country, is worthy of all the solicitude of the Ministry, and the consideration of the Chambers. It would be a good close to a session, which has turned to profit the doctrines of peace and order, to vote in favor of a vast work of pacification, tending to cement the union between France and Belgium, and strengthen our position in regard to the rest of Europe. It is, moreover, evident from the unanimous desire of the Chamber and the country to see France come to a positive decision on the question of railroads, that the presentation of the bill on this subject should not be delayed till the end of the present session."

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

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THE

INVENTORS' ADVOCATE,

AND

JOURNAL OF INDUSTRY.

SATURDAY, APRIL 24, 1841.

The bill introduced by the Government for the regulation of railways, has met with more opposition than on its first appearance was expected. The directors of many of the railway companies have petitioned Parliament against the measure, on the plea that it will unnecessarily interfere with their management,—and by producing a division of authority, will also cause a diminution of responsibility. It appears to us, on a careful perusal of the different clauses of the bill, that these objections are unfounded; and that the measure is skilfully framed, so as to avoid hurtful interference, whilst it places the management of railways under wholesome control. The purport of the bill, as indicated by its provisions, is to enable the Government to compel railway directors, in all instances, to adopt those precautions for public safety which experience has shown to be requisite; to ensure the employment of qualified men as engine-drivers; and to give the directors more complete control over those servants in their employ. We should regret to see the Government interfere in the management of railways further than to secure to the public the adoption by all railway companies of the improvements which ample experience on some lines has proved to add to the comfort, accommodation, and safety of the passengers. It is well known that, in some instances, a parsimonious economy, or a want of funds, or a culpable negligence of public safety, has prevented the directors from employing all the means of security which they would be ready to admit were desirable. The accidents that occurred from these omissions have shown the necessity of giving a superintending control to the Government; and we do not think it could well be of a more limited character than is proposed in the present measure. There may be peculiar circumstances in some lines, that render particular provisions useless and injurious, but the bill may be easily modified, so as to meet those special cases. As to the general principles of the bill, we feel convinced that they do not sanction the interference of the Government beyond the point which the public feeling demands, and public safety requires.

We never can admit that railway directors are responsible only to the shareholders of their respective companies. We maintain that they are also the servants of the people. They are authorised by the legislature to carry into execution an important branch of the public service, and they should be responsible therefore to the legislature for the manner of discharging their trust.

We hope it is not the intention of the railway interest to raise a systematic opposition against a measure which deals much more lightly with them than might have been anticipated after recent events and excited prejudices. At present, fortunately, the excitement and alarm which not long since prevailed on the subject of railway accidents have abated; but the public feeling, though calmed, is not extinct. Were the railway directors to manifest an uneasy and obstinate impatience of wholesome control, they would rouse the indignation of the community, and compel the adoption of a much more stringent measure than the one now proposed. We trust, therefore, that a consideration of their own interests will prevent them from making the opposition, which is in some quarters threatened; and that they will unite in a liberal spirit with other parties, in the endeavor to render the bill complete for its purpose.

NEW INVENTIONS.

A NEW SAFETY VALVE FOR STEAM BOILERS.

In a former number we mentioned that a new kind of safety valve had been invented by Mr. John Bakewell, of Pittsburgh, in Pennsylvania, which promises to possess a greater degree of certainty in its action than the metallic alloy plugs, without their inconvenience. We were then prevented from giving a particular description of the invention as it might have invalidated the continental patent, but the specification having since been published in America, we will now explain its peculiarity. The valve in outward appearance is nearly like that of a common lever safety valve. The fulcrum, however, to which the end of the lever is attached, consists of an iron rod that enters a tube closed at the other end, which is inserted in the boiler. This rod is fixed in the tube by pouring in a melted metallic alloy that will be fused at a temperature a little above boiling water. The proportions of this alloy are varied, so as to be more or less easily fusible, according to the pressure at which it is required the boiler should be worked. Between the top of the valve and the end of the lever, where the weight is placed, a prop is fixed, under the lever, but not touching it, which is to serve as another fulcrum whenever the first one gives way by the metallic alloy becoming fused. By this arrangement it will be perceived that whenever the heat of the water in the boiler becomes so great as to melt the fusible alloy, the fulcrum gives way; the lever then rests on the second prop, and the effect of this new disposition is to cause the weight to lift open the valve, which it was previously pressing down. Thus the addition of weight to the safety-valve, so far from increasing the danger, becomes an additional safeguard; for it tends the more effectually to lift open the valve in case of its sticking. By allowing the iron rod to sink again into the tube, among the fused metal, it will again become fixed, when the temperature of the water is reduced, and the original fulcrum being thus restored, the valve will be pressed down by the weight again, as at first. This ingenious contrivance seems to remove all the probability of danger arising from the imperfect construction of

safety valves, and it is not attended with any inconvenience. The proportions of the metals to form the alloys are given in the specification.

ACROGRAPHY—A SUBSTITUTE FOR WOOD ENGRAVING.

A new and valuable art, to which the name of "Acrography" has been given, by the inventor M. Louis Schönberg, has lately been introduced in this country. The object of this art is to transfer to metal plates any drawing made on paper with the proper materials; the lines being in relief, so that the etching may be printed with the letter-press types in the same manner as wood-cuts. We not long since translated from a foreign journal a notice of this process, or of one similar to it, which is now in actual operation. Several beautiful specimens of the engravings produced in this manner are now before us. They present the appearance of etchings on copper, very freely and boldly executed. The advantages of this art are many. In the first place, the drawing of the artist is reproduced line for line; therefore he becomes his own engraver; and as there is no more difficulty attending the execution of cross hatchings than in straight lines, works which to produce on wood would require a long and tedious operation, can by this means be produced with great comparative facility and cheapness. The process is kept secret by the inventor, as he rather chooses to run the chance of the discovery of his invention, than to incur the risk of infringement by taking out a patent. We suspect, however, that the principle of the mode of operating, is that of the electrotype, the applicability of which to the purposes of art and manufactures is becoming daily more extended.

SCIENTIFIC CORRESPONDENCE.

APPLICATION OF THE ELECTROTYPE TO THE ELECTRIC TELEGRAPH.

To the Editor of the "Inventors' Advocate."

Sir,—The great facility afforded by the Electric Telegraph in corresponding between distant places, would, I think, speedily bring it into general use, if it were not for the very great difficulty found in properly protecting the lines of conducting wires from injury from water and other causes. But I conceive we have very efficient means in our power for this purpose if we chose to use them. By the method at present employed, the insulating substances are very liable to be torn off the wires, by the action of drawing them into the tubes, and the tubes being made up of many pieces the joinings are so very numerous, that it is almost impossible to keep them water-tight for any length of time. Now I think there is an effectual remedy for this by forming a copper tube round the wires, by means of the electro-type. It can be done in the following manner:—Cover each of the wires with a sufficient thickness of insulating substances, then cover it with any substance impervious to water; then bind the wires firmly together with another coating of insulating substances, to be also covered with india-rubber or other materials, as before; then lay the wires down on the line in their proper place, but not fixed, except at the stations. Provide a long trough about five inches wide, and five deep; experience will best determine the length. Place it on small wheels, so as the bottom may be just free from the ground. Let a pulley be fixed to each end of the trough, for the purpose of keeping the wires from rubbing on the edge when the trough is being removed; that portion of the covered wires to be operated on should be well black-leaded. The trough should be so placed that part of the wires may be in one side of it; on the other side place a strip of copper, which should be the whole length of the inside of the trough. The trough must then be filled with a solution of the sulphate of copper; on to the trough must be fixed a shelf, on which is to be placed a galvanic battery. Connect the zinc pole of the battery with the black-leaded surface of the coating of the wires, and the copper pole of the battery to the strip of copper. In a short time a copper tube will be formed round that part of the wires in the trough, and as soon as it is of sufficient thickness the trough can be drawn forward, so that a fresh part of the wires may be in the solution; care being taken to keep the end of the newly-formed tube always in the solution, for if the air were to get to it for a very short time, the fresh copper would not adhere to it as a solid body. There would in that case be a joining at that place, although certainly a better joining than art can make, yet it is better to have the whole a solid body.

By the means I have here stated a solid tube can be formed round the wires, for any length, without any joining whatever. Any number of troughs and batteries can be employed on different parts of the line, according to the time in which the work is to be completed; but the telegraph can be worked all the time these apparatus are going on.

I am, Sir, your obedient servant,
Alexander Bain.

35, Wigmore-street, Cavendish-square,
April 19, 1841.

THE ELECTRICAL CLOCK.

To the Editor of the "Inventors' Advocate."

Sir,—Mr. Bain, in his letter published in your Journal of April 17th, has completely mis-stated the purport of the conversation which he had with me. I distinctly told him the instructions I received from Professor Wheatstone, on January 6th, 1840, related to the construction of an instrument which should show the time of a clock, with which it was to be connected by means of a voltaic circuit; in fact, to the very instrument to which Messrs. Barwise and Bain put in their claim. The other instrument to which Mr. Bain alludes was made by me for Professor Wheatstone long before that time. I am prepared, if called upon, to substantiate in a court of law the truth of my statement, should the unfounded claims of Messrs. Barwise and Bain render it necessary. My father-in-law, Mr. Graham, who works with me, can also speak to the same facts.

4, Cooke's Buildings,
Old Kent Road.

I am, sir,
Your obedient Servt.
John Lane.

To the Editor of the "Inventors' Advocate."

Sir,—I had not time last week to reply to your article "Loss of Motion (or rather, I suppose you mean, loss of *power*) by Reciprocating Action," in No. 88 of your journal. I certainly do not perceive that in that article you have advanced any new argument to support your hypothesis, or have *directly* replied to my letter.

In the first place you say "the principle for which we contend is this; that in reciprocating steam-engines, in which the action is reversed at each stroke, there must be a loss of power by this reciprocating action, unless the whole momentum each way be effectively exhausted by the time the piston arrives at the top and bottom of every stroke."

Now, why should not the momentum be effectively exhausted? You have advanced no argument or proof that it is not exhausted, but merely state such to be your opinion. However, as it appears to me that nothing short of a direct experiment will convince you, I purpose taking advantage of an opportunity which will soon occur to put our opinions to the test, and will forward you full particulars.

Secondly. It cannot make any possible difference in arguing the first position, viz. the loss of *momentum* by reciprocation, whether the power from which it is derived is applied to the piston, or crank end of the connecting-rod or beam, the reciprocating parts are controlled in their velocities by the crank in either case, the velocity of the fly-wheel being uniform.

Having thus far discussed this question of reciprocation I will now enter on the subject of crank-action; but first, allow me to put a question or two, as I think that they will save time and tend to define the points of difference. You will, I trust, have no objection to give an answer either negatively or affirmatively; and bear in mind, that victory is not the object, but *truth*; for I candidly confess that I shall not regret your being successful, provided my positions are proved to be inconsistent with sound philosophy.

First. Do you consider it impossible by any arrangement to make the connecting-rod act on the crank, throughout the entire stroke, in lines parallel to the piston-rod, without loss of power?

Secondly. Supposing the above possible, do you then consider that by any arrangement, the whole of the power applied to the piston would not be effectively transmitted to the crank-shaft, after deducting friction, and the supposed loss of momentum from reciprocation? I rather imagine from your *à priori* reasoning on the "loss of motion (or power) by the crank," in your last number, that your answers will be affirmative, and I must confess that I consider that article either required a more complete elucidation of your views, or more reflection, for you appear to have forgotten that the diameter of the circle described by the crank, and that of a circle whose circumference is equal to the length of the stroke, is as 3.14159, &c., to 2, and, consequently, that when the connecting rod is at its maximum angle (viz. half-stroke) with the piston-rod, its leverage is increased equal to half the difference of those numbers.

I am, Sir, your obedient servant,
Norwich, April 13, 1841. F. Ham.

[We intended to have replied at some length to the queries of Mr. Ham, but as it would be for the most part to repeat, in other words, our former opinions, we will let the question of reciprocation rest until the experiment Mr. Ham alludes to has been made. We do not understand the drift of Mr. Ham's questions relative to crank action. The question to be determined, is not whether by any possible arrangement the crank can be so improved as to act without loss of power; but whether any, and what amount of power, is lost by the crank as at present employed. The action of the connecting-rod on the crank in lines not parallel to the piston-rod, is, we consider, only one of the elements of loss of power in the crank.]

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(Contributed expressly to the Inventors' Advocate.)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING APRIL 26, 1841.

Monday	Geographical Society	9 P.M.
Tuesday	Medico-Chirurgical Society	8½ P.M.
	Zoological Society	8½ P.M.
	Royal Botanic Society	8 P.M.
Wednesday	Society of Arts	7½ P.M.
	Microscopical Society	8 P.M.
	Medico-Botanical Society	8 P.M.
Thursday	Geological Society (Anniv.)	3 P.M.
	London Institution (Anniv.)	12
	Royal Society of Literature	3 P.M.
	Royal Society	8½ P.M.
	Society of Antiquaries	8 P.M.
	Numismatic Society	8 P.M.
Friday	Royal Institution	8½ P.M.
Saturday	Westminster Medical Society	8 P.M.
	Mathematical Society	8 P.M.

BOTANICAL SOCIETY OF LONDON.

April 16. J. E. Gray, Esq., F.R.S., &c., President, in the Chair.

Mr. S. H. Haslam, F.L.S., was elected a member. A presentation from Mr. H. O. Stephens, of Bristol,

of some rare British Fungi from that vicinity, was announced—forming the third series forwarded by that Fungologist. Among them was one (*Agaricus stolonifer*), new to Britain.

Mr. John Reynolds communicated an abstract of M. Dutrochet's researches "On the Natural Temperature of Plants." The results tend to prove that plants have a specific heat independent of that of the surrounding atmosphere. The instrument lately employed by Dutrochet was a thermo-electric apparatus, of a very sensitive character, appreciating the most minute differences with considerable accuracy. The needles were made of very fine copper and iron wire, turned up at a very acute angle. The points are always plunged to the depth of five millimetres in the vegetable submitted to observation. The heat of the green part of plants, the maximum of which was by a former experiment one quarter of a centesimal degree, rose sometimes to one-third, for example, in the stem of the *Euphorbia Lathyris*. The stems lose this heat when they are converted from the herbaceous to the ligneous state, at least such heat is not appreciable. Dutrochet has detected the existence of vegetable heat in the roots, fruits, and even in the embryo of plants. It is generally during the first three hours from noon that the maximum of vegetable heat exists, being that part of the day when there is usually most heat and light; after this time, however, although the heat and light may increase, the temperature of plants seems to diminish. This diurnal paroxysm, this sort of daily fever experienced by plants, receives no interruption but from the complete absence of the sun; and what is very remarkable, this interruption does not always cease on the first day of complete darkness; indeed, it has been observed to be repeated on the first day, and sometimes on the second, its maximum occurring always at the same hour. The third day of darkness it never returns. Exposure to simple diffused light is sufficient to restore to the plant, in a rapid and very remarkable manner, the heat it has lost.

A letter was read from Mr. James Rich (Local Secretary for Minorca), describing some of the peculiarities of the botany of Algiers and its neighbourhood.

Mr. Daniel Cooper then made some verbal observations on the Structure of Straw (pointing out the peculiar nature of its cuticle or skin) in connection with its durability when manufactured into hats or bonnets. The lasting character of the straw is to be accounted for on truly philosophical principles, and may be explained, and is altogether in accordance with the nature of the structures of which it is composed. If a thin section of the glazed cuticle or outer covering of the straw, which is of a silicious nature and on which its durability depends, be examined microscopically, it will be found to be composed of elongated cells of cellular tissue, the walls of which appear to be divided transversely by means of tortuous lines. It is in this part of the cuticle (skin) that Mr. C. considers the *silex* is deposited. On proceeding towards the ligneous structure of the straw, beautiful examples of the *Annular Ducts* were found, having the rings of fibres enclosed in the sheath of the vessels variously and beautifully arranged. The internal structure of straw is of a white and truly *cellular* nature—it is this part which is so plaited by the dealers as to present the silvery white appearance externally—and from which it takes the name of *rice-plait*, on account of its great resemblance to that obtained from *rice-straw*. Such plait, however, is by no means so durable, as from its structure, by simple exposure to the variability of climate, the *white* film gradually peels off; a consequence of the arrangement of the tissue forming the same. Mr. C. then entered into some detail on the mode of cultivating and preparing straw for the purpose of straw plait; the information afforded having been obtained from the manufacturers at Luton, Bedfordshire, one of the greatest, if not the largest markets in the kingdom. A chalky soil has always been considered favorable for the growth of straw—much more so than one of a sandy nature—as in the latter, the stems or culms of the corn have a larger quantity of silex deposited in them than is considered requisite, and which, in fact, materially interferes with its clean manufacture into straw-plait. The well-deserved notoriety of the Dunstable plait is attributed to the nature of the soil of the surrounding country, from whence the straw is obtained; and it is a curious fact, as stated by Mr. Vyse, of Luton, that, if the straw grown in that neighbourhood be sent into Essex or other parts to be plaited, the article is by no means of the same quality as that plaited in the neighbourhood where it is grown—a fact which is probably to be accounted for solely from some property in the water, which is necessarily used to render the straw of that pliant character to enable it to be more readily worked. Considerable conversation ensued on this subject, and the president stated how important it was to have matters connected with the economy of vegetables brought before the notice of the society.

Mr. Hewett Cottrell Watson exhibited some specimens of *Primula veris* (Cowslip), in which the petals had become enlarged and expanded, and the color and general appearance were that of the *Primula elatior* (Oxlip). He also stated that he had been for some seven years a diligent explorer of the part of the country in which he resides, and had not until this year met with any specimens of the oxlip, confirming in his mind the accuracy of some statements made by Prof. Henslow, that these plants were merely varieties of each other brought about by the peculiar nature of the soil.

The President stated that the rooms of the Society henceforward would be open Mondays, Wednesdays, and Fridays, from 10 to 4, when Mr. Joseph Geiger, the curator, will be in attendance to render every facility for inspecting the Society's collections.

CHEMICAL SOCIETY OF LONDON.

April 13. *Professor Graham, President, in the Chair.*

A meeting of this society was held at the room of the Society of Arts, John-street, Adelphi, when, after reading and confirming the minutes of the last meeting, and the proposing of a number of new members and associates, the President vacated the chair, for the purpose of reading a communication from Professor Liebig, "On the Manufacture of the Salt usually called the Prussiate of Potass (*Ferrocyanide of Potassium*)." On the chair being taken by J. T. Cooper, Esq., V.P., the communication alluded to was read, and some new views relative to the theory as well as the economy of the process, illustrated by diagrams and formulæ, explanatory of the changes produced by the action of fund potassa, its carbonate and sulphate, on animal substances, in open and close vessels, were frequently referred to during the reading of the paper. A short but interesting discussion then took place, in which Mr. G. Lowe, Dr. Leeson, Mr. De la Rue, Mr. Wheeler, and Mr. Aikin took prominent parts; it was, however, finally arranged, that as the communication involved so much of detail, the discussion should be postponed until the members generally, by studying the paper at their leisure, had become more familiar with its contents, or until it had been abstracted by the council, and its merits more definitely placed before the society. The President having resumed the chair, Mr. Parnell then read an interesting paper on *Mellon* and *Sulphocyanogen*, explanatory of the changes that occur in the formation of these substances. For the reasons above stated, the discussion was deferred. The society then adjourned until Tuesday, the 27th inst.

LONDON ELECTRICAL SOCIETY.

On Tuesday the first meeting of the season 1841-42 was held at the Royal Gallery of Practical Science, Adelaide-street. After having announced the election of several new members, the chairman stated that Walter Hawkins, Esq., had presented to the society a dried specimen of the gymnotus electricus. A letter was read, in which Mr. Hawkins observed that he should still continue to exert himself to obtain living specimens of the eel, and regretted that he had failed in his endeavours hitherto. A letter from J. P. Gassiot, Esq., F.R.S., was next read, describing a voltameter with five pairs of electrodes, each or all of which could be employed. When all were in circuit the surface in action was 162 square inches. This apparatus had been constructed in order that surfaces of electrodes might be used bearing some proportion to the surfaces of the battery cells excited. Mr. Gassiot promised to lay before the society the result of experiments with this instrument. A paper from G. Mackrell, Esq., was read, detailing experiments made with a constant battery; also one by Thomas Pollock, Esq., containing a long series of experiments upon the application of heat to certain solutions which are susceptible of change in color. The resulting electric effects of this latter series were given in a tabular form. The valuable contents will be published in the proceedings of the society, the next part of which, in octavo, will appear on the 1st of July.—*Morning Post.*

EXPORT OF MACHINERY.

(Continued from the Times.)

We gave in a recent number an outline of one portion of the evidence on this subject which has been adduced before the committee of the House of Commons; and we now proceed to state the nature of the objections urged against that freedom of export which British manufacturers generally enjoy.

The only witnesses examined against a repeal of the law were Messrs. Felkin, Birkin, Herbert, and Sewell, from Nottingham. The first of these gentlemen was the principal witness, and he adduced a considerable amount of entertaining statistics upon the hosiery and bobbin-net trades. He stated that of stocking frames there were in use throughout England in 1833, 33,000; the value of each machine he estimated at £30, although he afterwards stated an average of the sales of 3,916 during a course of years, showing that the buying price for the most recent series of years was only £4; and, he added, that very few have been made for many years. In 1836 the number of bobbin net machines employed was 3,547, worth at this time £700,000. The hosiery trade employed directly and indirectly about 73,000 and the lace about 160,000 hands, the latter number consisting principally, not of persons employed with the machines, but mainly of "embroiderers," living in Bucks and other agricultural counties, and having no connection with the machinery, except that it is, as it were, the feeder to their employment. In 1833 the amount of hosiery produced was £1,991,000; of this £814,000 was paid for the yarn (produced in Lancashire), leaving £1,177,000 for wages and profit in Nottingham. It appears that a practice prevails in Nottingham of hiring out machines to workmen, and Mr. Felkin estimates this annual rental upon stocking frames at £100,000. There are few or no machine-makers; manufacturers are their own machinists. A new stocking frame indeed is a very rare thing. Mr. Felkin gave further, as to the bobbin-net lace trade, the annual return, which was in 1836, £2,212,000, of which the raw material (wool and silk) amounted to £210,000, and was worth, when made into yarn, £664,330, leaving for wages and profit in Nottingham £1,545,670. He furnished, likewise, a return from four districts in Nottingham, showing that in 1835 there were 1,312 bobbin-net machines, and that there had been broken up 483, exported 79, and standing idle 141, leaving 617 at work.

He further stated, that about 1836 the Nottingham manufacturers formed themselves into a committee to prevent the illicit export of machines, and that they succeeded to a considerable extent. The machines used in the bobbin-net trade are now made by the manufacturers themselves: there are

few or no machinists in this branch, and improvements are generally grafted on old machines. Entirely new inventions are very rare, and machines which have been cast aside as useless are thus frequently brought again into profitable play. On this subject Mr. Felkin was asked—

"Do you not think that the owners of machines in the neighbourhood of Nottingham would export machines, when they were either unemployed, or employed to little advantage?—I think there are owners who would be disposed to do that, under the expectation that they could replace such machines by superior ones; but, on the whole, I think the feeling on the part of the trade is to prevent the exportation of machinery.

"Have improvements been introduced into the machines?—Improvements are constantly so introduced: machines that were a few years ago, in consequence of their supposed non-application to the existing state of things, or their use at the time, selling for two and three and four pounds a-piece, which had cost as many hundreds, and were equally well calculated to produce good work of the particular kinds in most respects as they have ever been—those machines, so reduced in supposed value, have since risen, from the simple circumstance of alterations in them on the spot, to the value of £60, £70, and even £100.

"Is the machinery at present employed in the bobbin-net trade uniformly of the improved description, or are there a vast variety of machines working in different stages of improvement?—The first machine, of a certain construction, one of the very earliest construction, Mr. Heathcoat's, who is extensively engaged in this department of business, I ascertained was at work profitably, within the last three years, at Loughborough; he would have constructed that machinery about the year 1815; it is one of the narrow, and certainly one of the very old modes of construction; but still it was so arranged as to be profitably at work, within the last two years, as I understood. I did not see the machine, but I had it from sufficient authority to justify me in mentioning it; and it is within my own knowledge that very narrow, and what were once supposed to be very inferior machines, are now not only profitably, but as profitably at work as any of the most recently constructed.

"It is of late years that the machinery of France has been improved?—It has gone on gradually improving; it follows us in certain steps, if it be called improvement, but I have an opinion that that which is supposed to be an improvement may not be so; it is the question of the capacity to produce goods which may be profitably sold, and I do not apprehend that many of the changes to which machinery has been subject there at all prove that there has been any improvement in the construction of the machinery."

Mr. Birkin stated that he had gone abroad with a view to satisfy himself of the competency of the French to compete with us, and had returned with his mind set at rest. It appears that there are in France nearly 2,000 bobbin-net machines, but that (conformably to the view conveyed by Mr. Felkin and Mr. Herbert, that manufacturers' success even in Nottingham arises from their constant invention and improvements, and adaptation of the machines to produce some new variety of combination) they have not our last improvements, nor can they produce as cheaply or as well. They are compelled, in fact, to use English yarn, which, as well as the lace, they smuggle very largely—the lace itself to be embroidered and sent back for sale in England. In like manner with the stocking, as with the lace machines, Mr. Felkin stated, "all the cities in France have a considerable number of stocking frames in them, and all of them of very ancient date." (Mr. Felkin traces many of the English frames back to the time of William and Anne.) In Saxony they produce their own machines, and he accounts thus for the progress of the stocking manufacture in that country:—

"Are you aware why they have succeeded so well in rivalry with us?—From the circumstance of their having turned their attention to this as a staple production, whereas, formerly, it was so small as only to supply the local districts of the country in which it was—Saxony and the surrounding districts; the frames were spread over a large district; now they are more congregated together, and the means of supplying the raw material are more easy, so that they can get the raw material at less cost; there is one particular reason, however, which may be properly stated in answer to the question, and that is the fact, that in Saxony most of the workmen have a small quantity of ground connected with their dwellings, and the manufacture of stockings is not, as it is in this country, the sole means of the support of the persons engaged in it; consequently they can go to market with their products, and they do not keep back those products generally, merely on account of some slight difference in the price they might receive for them."

These gentlemen considered the prohibitory laws to be at present nugatory, and that machine-making is progressing fast abroad.

The evidence appears to show, both as regards the cotton, the flax, the lace, and even the hosiery trades, that exports of manufactures are very mainly to those countries which have the largest supply of machinery, foreigners being unable to apply profitably the machines they do obtain.

From statements made and returns put in, it also appears that the trade of machine-making has greatly increased in this country, there being embarked in only the principal establishments of eleven towns in Lancashire a million and a half of money, and in Leeds and its neighbourhood nearly half a million. The increase in Lancashire has been chiefly in tool-making shops, it being a curious fact that tools being free of export, there is not a single tool-making establishment on the Continent—so completely does freedom of commerce check foreign rivalry.

ON THE MEANS OF PREVENTING TREMOR IN MICROSCOPES.

BY MR. ANDREW ROSS.

(Extracted from the Microscopic Journal, No. 2.)

It would be needless here to insist upon the importance of *steadiness*, or perfect freedom from vibration, for the successful prosecution of microscopic observations. Numberless contrivances have been resorted to for the purpose, the most successful of which, is probably the use of a very large mass of stone or metal as a support for the instrument. But the necessary weight of such a mass involves inconveniences which quite prevented its general adoption, and have led to the application of expedients, which, without entirely destroying the vibrations, should render them as little injurious as possible. I may mention as one tolerable arrangement of this sort, my own mode of supporting the compound body on a bar, which, together with the stage, form one solid casting, so that the vibrations, which in this case take place principally from the joint, affect the body and the stage as nearly similar as possible, and produce an effect certainly much less prejudicial than when the compound body, supported only at its lower extremity, vibrates not only to a much greater extent, but independently of the stage. As, however, all the expedients hitherto resorted to are either imperfect, or nearly impracticable, I was induced to make a series of experiments, and I will describe that, which after many trials and modifications, I have found to be the most successful.

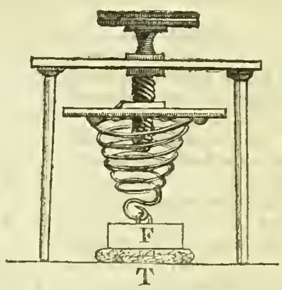
The principles it seems to demand are—

1st. That a very large proportion of the weight of the instrument (say nine-tenths or thereabout) be supported upon springs.

2d. That the remaining one-tenth or thereabout be supported upon soft felt, or other fibrous substance.

3d. That the attachment of the springs be such as to *suspend* the weight, because if supported by placing the springs underneath the weight, lateral stays would be required, and through these, vibrations in the plane of the table might be transmitted to the instrument.

One method of applying these principles is by the apparatus shown in the annexed diagram, one of which is to be applied to each foot of the microscope. T represents the table upon which the instrument stands; F the end of one of the feet of the microscope; the part between T and F the felt



or other fibrous substance. A hook is shown at the end of the spiral spring, and another hook in the foot of the microscope, by which the spring and instrument are connected. The other end of the spring is fastened to the plate into which the screw acts. This screw is supported by the plate above, and again this plate is supported by three legs which stand upon the table, only two of which are shown in the diagram. The apparatus is adjusted by the nut at the top, which turns the screw and raises the plate and spring connected with it, until a sufficient quantity of the whole weight of the instrument is supported. The necessity for the screw adjustment is, that, when the instrument is differently inclined, the weight varies upon the same feet; there is also a difference in the character of tremor, which requires a different adjustment of the springs, to prevent it being communicated to the microscope; an example of this is where the tremor is produced by the rapid motion of carriages along the streets, and that produced by a person walking in a room. In the first case a great proportion of the weight must be supported by the springs, and in the latter the feet of the microscope should have some considerable pressure upon the table.

MINES IN SOUTHERN RUSSIA.

A letter from Odessa, in the *Constitutionnel*, states that M. Hommaire de Hell, a French engineer, has made some important discoveries of mineral veins and coal in various parts of Southern Russia. The Russian Government, through the medium of Count Woronzow, has received some memoirs drawn up by this gentleman with great satisfaction, and has given him every encouragement. On the banks of the Dnieper, M. Hommaire has found a considerable formation of iron-stone. He has visited all Bessarabia and the Kherson, going up the stream that falls into the Dnieper, and has since explored the Crimea, going up the Don and the Donest. In all these directions he has found abundance of vegetable and anthracite coal, sufficient for the supply of a large part of Russia, and likely to be of immense value to the Levant trade. The richest coal field is on the shores of the Sea of Azoff, between the Dnieper and the Donest; and a great part of it is crown property. In many spots the coal crops out on the surface. M. Hommaire has been offered the direction of the works at this place; and he estimates that the coal, which is fully equal to the best English, may be delivered at a port on the Dnieper or the Don at from 50 to 60 centimes the 100 kilogrammes, or from 4s. to 5s. the ton. It is believed that the Russian Government will allow this coal to be exported.

THE GOLD MINES OF OURAL.

A Table showing the Quantity of Gold and Platina which has been Extracted from the Mines of Oural during the latter half of the year 1840:—

	Pouds	Liv.	Zolot.	
GOLD.—CROWN MINES.				
Mines of Catherinebourg	15	23	93	52-96
Zlatooust	25	29	31	
Bohosloff	17	10	39	
Goroblahodat	7	22	72	
Total	66	6	43	52-96
PRIVATE MINES.				
Mines of Verkh Isset—belonging to a Cornet of the Zakovleff Guard	22	4	14	
Kasszne and Kyschtzzme—belonging to the heirs of Rastorgouzeff	7	20	6	
Nijni Tahil—belonging to M. Demidoff	8	7	53	
Syssert—the heirs of Tourtchamnoff	9	26	27	
Schaitam—to Zartsoff	2	17	53	
Neviane—to M. Zakooleff	5	35	93	
Bilimbaieff—to the Countess Stroganoff	0	16	50	
Reodine—to M. Demidoff	0	1	10	
Vsévolodoblahodat—to M. Vsévolozsky	6	28	11	
Krestovozdvigénie—to the Princess Butera	5	34	13	
Gold Wash of Troisk—to the Hon. Counsellor Zoukorsky and Co.	2	13	80	
Verkné-Oufaleisk—to M. Goubine	0	32	94	
Iltabanoff, on the property of the Tepticus—to the Lieut-General Jemtchougnikoff and Co.	4	12	69	
Bourziansh—belouging to the same, and M. Goussiatnikoff	0	13	68	
Petroparlovsk and Vosskressensk—to the Secretary for Astafrieff	2	12	24	
Rostesk (district of Solikamsh, Government of Perm)—to the Countess Stroganoff and the Chamberlains Lazareff	0	12	77	
Maloistokskaia—to an *employé* in the Medjer Mines	0	4	43	
Belonging to Mme. Kluhvine	2	0	2¼	
Gold discovered on the persons of individuals who had stolen it from private mines	0	3	75	
Total	79	18	3¼	
General total of gold extracted from the mines	145	24	46	76-93
PLATINA.—CROWN MINES.				
Mines of Zlatooust	0	3	30	
Bohosloff	0	0	27	
Total	0	3	57	
PRIVATE MINES.				
Mines of Verkh Isset	0	4	36	
Nijni Tahil	47	19	32	72 96
Kasszne and Kzshtzme	0	5	21	24-96
Bilimbaieff	0	0	17	50-96
Krestovozdvigénie	0	0	5	63-96
Vsévolodoblahodat	0	4	78	48-96
Néviane	0	0	95	
Platina washings—belonging to Countess Stroganoff and the Chamberlains Lazareff	0	0	13	60-96
Platina taken from individuals who had stolen it	0	5	8	
Total	48	2	74	29-96
General total of platina extracted from the mines	48	6	35	29-96

During the year 1840 the total quantity of gold extracted from the Crown and private mines of Oural amounts to 299½ pouds, and 94 pouds of platina. In the district of Altai the gold sands have produced 246 pouds, and those in the district of Nertchinsk 6 pouds; so that in the year 1840 the quantity of gold produced amounts to 551 pouds, without reckoning the gold extracted from the silver drawn from the districts of Altai and Nertchinsk, which makes the total quantity of gold, for 1840, 586 pouds, being 54 pouds more than in 1839.

SCIENTIFIC MEMORANDA AND NOTES ON ART.

Royal Asiatic Society.—The ordinary meeting was held on Saturday, Professor Wilson in the chair. The secretary read a paper from Dr. Wilson, M.D., president of the Asiatic Society of Bombay, being an account of the Waralis and Katodis, two of the forest tribes of northern Kokan. Dr. Wilson described the habits of those tribes, their capabilities for civilisation, religious observances, chief occupation, and general character, with some suggestions for their moral improvement. In the course of his remarks he observes that the Brahminical religion gradually propagated is now dominant in India. It is not, and it never was, however, universal in its sway. Buddhism, which claims alliance with it in its origin, hut which differs greatly from it in its essential principles, was, for many centuries at least, more than its rival; and many tribes inhabiting the forests and mountains of the country have either not succumbed to its authority, or refrained from receiving its doctrines without great reluctance. Some presents to the library and museum were exhibited, after which the meeting adjourned.—*Morning Post.*

Art Union.—On Tuesday the fifth annual meeting of the subscribers to the "London Art Union" took place at Willis's Rooms. The Duke of Cambridge presided. The Duke of Cambridge congratulated them on the greatly increased prosperity of the Union, and he did so with the more satisfaction, as he was instrumental in forming a similar association in Hanover ten years ago. That society was, he learned, most flourishing; and he rejoiced that this metropolitan association was so rapidly extending, and had become so firmly established in public estimation, which he inferred from the fact that the number of members now was 5,012, while the last year the number was 1,959. The report having been received and adopted, scrutineers were appointed to superintend the drawing of the prizes for the year. The holders of prizes are severally entitled to select works of art of value equivalent to the amount of the prize from the exhibitions (of purchaseable paintings) in the Royal Academy, Society of Painters in Water Colours, British Institution, Society of British Artists, or the new Society of Painters in Water Colours. The highest prize was £300; it was gained by Mr. George Fry of Greenwich; the next was £200, that was won by Mr. T. D. Light, of the Prerogative-office, Doctors'-Commons; the third, a £100 prize, was allotted to Mr. Staunton, of Holbeach. The successful candidates for other prizes were the following:—The Rev. Robert Ray, £80; Lieutenant-Colonel Robinson, £75; Mr. Nunn, £50; Dr. Whatmough, £50; Mr. Smallman, £50; Mr. M'Karkell of Northampton, £75; Miss Lovegrove of Warrington, £50; Mrs. Howley (Lambeth Palace), £20; Mr. R. E. Henderson, £50; Mr. Fry of Nottingham, £80; Mr. Alderman Farebrother, £10; and numerous others.

Horticultural Society.—A very full meeting was held on Tuesday afternoon, Dr. Henderson, V.P., in the chair. The show was one of the first of the season, and was much commended. There was a very rich collection of Azalias, Rhododendrons, Cinerarias, Auriculas, and orchidaceous and miscellaneous plants, which were liberally rewarded.

London University College.—By a codicil to the will of Mr. Wm. Thomas, late of East-street, Red Lion-square, proved recently in the Prerogative Court of Canterbury, a legacy of £500 has been bequeathed to University College Hospital.

Striking from Leaves.—In the spring of 1838, previously to his leaving Downton, it occurred to Mr. Knight's inventive mind, that plants might be propagated from single buds and leaves only. Accordingly, he had several pots filled with a fine sandy loam; *the pots were about twelve inches in diameter*, to receive the cuttings, which he prepared himself. The buds and leaves were cut out, as is usually done when intended for insertion in stocks, with but a very small portion of the alburnum to each. The kinds he operated on were double Camellias, Magnolias, Metrosideros, Acacias, Neriums, Rhododendrons, and many others. The soil in the pots having been previously pressed firmly down, and the surface made perfectly smooth, the cuttings were inserted with a dibber, so as just to cover the bud, when the soil was pressed firmly against it. The back of the leaf lying on the surface of the mould, was fed by absorbing moisture from it. The surface of the pots was quite covered with leaves, but so disposed that they did not overlap each other; they were then gently sprinkled with water, covered with bell-glasses, and placed on the flue of a forcing-house. The sprinkling was afterwards frequently repeated, and the glasses shaded from the sun, by hanging paper over them. In a short time, the buds were seen breaking the surface of the mould, and by the end of summer some of them had made shoots of six and eight inches long, especially the Camellias, which were then potted off. The others that had not made equal progress, remained as they were until the following spring, when they likewise were potted, and found to be firmly rooted. Since that time, I have tried other sorts with equal success, but perhaps plants that have large leaves are best adapted for this mode of culture.—*Gardeners' Chronicle.*

Animalcules in Plants.—Meyen has observed that the spermatic animalcules of *Liverworts* and *Mosses* have tails like those of animals, and develope themselves singly in the grains of pollen, and also in the *Chara*. The globules are only cells of slime in which the animalcule forms itself. The cell then disappears, and the animalcules lie curled in a spiral form in the thread of pollen, which bursts in water, and releases the animalcule. They at first cling by their long tail to the thread, but subsequently swim about freely and quickly. In *Marchantia Polymorpha* a single animalcule proceeds from every cell of pollen mass. In *Hypnum argenleum* the masses of pollen adhere for a long time to each other. A. Von Humboldt and J. Muller have seen their motions. They are those of true Infusoria, and not like those of the Molecules of Robert Brown.—*Microscopic Journal, No. 2.*

A New reflecting Microscope.—Mr. Guthrie modifies Amici's Microscope, by removing altogether the plane speculum, and placing the object to be viewed in the axis of the tube. This arrangement is to the microscope what Sir W. Herschel's is to the reflecting telescope. In order that the object may be properly illuminated, the part of the tube next the mirror is wholly removed, and three pillars substituted for it, to one of which the stage for the object is attached, and regulated by an adjusting screw.—*Jameson's Journal*, No. 44.

Chinese Library.—A recent report to the Russian Government contains an account of the Chinese library, which forms part of the Asiatic Museum of the Imperial Academy of Sciences at St. Petersburgh. This library was founded in 1730, at which period the Russian resident at the court of Pekin, sent by the Emperor Peter I., transmitted several Chinese works. Since that period the collection has been constantly increased by contributions, either from envoys, or by purchase; and a catalogue has been regularly made. The last addition was from the purchase of the rich collection of Chinese works of Baron Schilling de Constadt, through the munificence of the Emperor. M. Brosset, the librarian, has lately classed all the works, and composed a new catalogue. This library, which is second only to that of Paris, contains 1,364 volumes bound, and 11,510 unbound. Among them are a general statistical account of China, in 300 unbound volumes, and a general history of the Chinese Empire, from the most remote period down to the present age.

Process for Preserving the Dead entire, known in 1663.—John Ray in his work, "Observations &c. made in a journey through part of the Low Countries, &c., London, 1673," states, "that in May 1663, when at Brussels, it happened *Ludovicus de Bills* to be in town, whom we visited, and saw five bodies which he had with him, embalmed and preserved after his newly-invented manner, entire with all their entrails and bowels. He was then going to the University of *Lovain*, with whom he had made an agreement for the discovery of his art, and reading public anatomy lectures." We are not aware of the preparations used, but may they not be analogous to that employed by M. Gannal? an account of which will be found in a former number.

Important Discovery.—The *National* states that a distinguished mineralogist had just communicated the following fact to the editor of that journal, which he considers most important to the commercial interests of the country:—"A wonderful discovery has just been made in the south of France. It consists of a coal mine of 100 square leagues in extent. The coal obtained from this mine is found to be superior to the coal produced from the most celebrated collieries in existence. The south of France, Africa, Italy, Spain, and even Great Britain will derive considerable advantage from this discovery, and the trade of the Mediterranean will be benefited by it to an incalculable extent."

Ice in India.—In India, ice is made by placing the water to be frozen in flat unglazed earthen vessels, which are exposed during the night; they are placed upon the worst conductors that can be procured, such as sugar canes, dried maize, &c. The dryness of the air causes a very considerable evaporation, and the consequent reduction of temperature is such, that a thin film of ice is formed towards morning, though the temperature of the air may have been all the time above the freezing point.

First Hackney-coach Stand.—The first hackney-coach stand was established in London in 1604. Garrard thus describes it in a letter to Strafford:—"I cannot omit to mention any new thing that comes up amongst us, though never so trivial. Here is one Captain Baily; he hath been a sea captain, but now lives on the land, about this city, where he tries experiments. He hath erected, according to his ability, some four hackney-coaches, put his men in livery, and appointed them to stand at the Maypole in the Strand, giving them instructions at what rates to carry men into several parts of the town, where all day they may be had. Other hackneymen seeing this way, they flocked to the same place, and perform their journeys at the same rate. So that sometimes there is twenty of them together, which disperse up and down, that they and others are to be had everywhere, as watermen are to be had by the waterside. Everybody is much pleased with it. For, whereas before coaches could not be had but at great rates, now a man may have one much cheaper."

VARIETIES.

Effect of Railways on Physicians' Fees.—It is stated in the *Observer*, that the medical men of first eminence who have been hitherto accustomed to charge at the rate of a guinea a mile for visiting a patient in the country, have determined to reduce the fee, owing to the increased facility of travelling

now afforded by railways. A conference of some of the heads of the profession is about to take place to regulate the fees according to altered circumstances. Barristers who are retained specially in the country, will, it is thought, be obliged to adopt some similar course to that of the Physicians, and as their time is so much less consumed than formerly by the journey, that they will reduce their fees.

Foreign Sugar.—From a parliamentary return, it appears, that the total quantity of foreign sugar unrefined entered for home consumption, between the 5th of January, 1840, and the 5th of January, 1841, amounted to 2,315 cwt., and that the total quantity of foreign sugar refined in bond, exported from London and the outports of the United Kingdom, during the same period, amounted to 120,999 cwt.

The Funded Debt, &c., of Great Britain and Ireland.—It appears, from official reports, that the public funded debt of Great Britain (exclusive of the capitals transferred to the commissioners) amounted, on the 5th of January, 1840, to £732,649,694 18s. 5d., & that of Ireland to 33,897,989 18s. 11d. making altogether £766,547,684 17s. 4d. The total annual charge upon which, including Ireland, amounted to £28,748,794 7s. 8d., exclusive of the annual charge on capitals, &c., standing in the names of the commissioners. The Exchequer-bills outstanding and unprovided for on the 5th of January, 1840, amounted to £20,951,550, and on the 5th of January, 1839, to £24,026,050.

Mine Explosion.—On Tuesday an explosion of firedamp took place in Whitley Colliery, by which the under-viewer, Mr. Clavering, was so much burnt as to cause his death on the following day.—*Durham Advertiser.*

Post-office Returns.—From the Post-office Returns recently ordered to be printed, it appears that the total number of chargeable letters passed through the London General Post-office during the four weeks ending January 4, 1840 (one month after the general reduction of postage), was 2,102,281; and for the month ending March 27, 1841, it amounted to 5,060,127, proving an increase of 2,957,846. In the London district department, the number of letters during the month ending January 4, 1840, amounted to 1,302,555; while in the month ending March 27, 1841, the number was 1,766,158, showing an increase of 463,603. The number of letters delivered in the United Kingdom during the week ending March 22, 1840, was 3,069,496; and in the week ending March 21, 1841, it was 3,721,455; here an increase of 651,959 has taken place. For the year ending January 5, 1840, the net revenue for the United Kingdom was £1,633,764 2s. 9d., and for the year ending January 5, 1841, it was £465,927 4s. 8¾d., showing a decrease of £1,167,836 18s. 0¾d.

Reduction of Duties on French Wines and Spirits.—It is reported that the proposed reductions to be made under the new commercial treaty with France will be to 10s. per gallon on brandy, and to 1s. 6d. per gallon on wine. The conclusion of the commercial treaty is dependent on the ratification of the political treaty, which will withdraw France from her present isolation.—*London Journal of Commerce.*

The New Riding-School at Windsor Castle.—This building which is one of the most extensive riding-schools in the kingdom, is nearly finished. Within the last few days upwards of 30 wagon loads of tannin have been laid down on the floor, and several more will be required for its completion. Although the building has been for some time past in a fit state for the temporary use of the Queen, Her Majesty has not taken equestrian exercise since the arrival of the Court at Windsor.

Loss of a Steam-boat in America.—A fine steam-boat, the Chester, was lost a few weeks since near Chester, on the Mississippi. All lives on board were saved, but the property that went down was worth 40,000 dollars.

The March of Common Sense.—The *Leipsic Gazette* states, from Prussia, that the Minister of Justice has issued an order for the suppression of all Latin and French terms in legal documents and proceedings, and for the adoption of a plain style which can be understood by the people in general.

Hydrophobia amongst Sheep.—About three weeks ago, a dog made its appearance at Ray, in the parish of Kirkwelpington, and in the course of 12 hours it bit 27 sheep, on that and the neighbouring farm. It was detected in the act, and killed. Since then nearly the whole of the bitten sheep have died, and mostly all in a pitiable state of madness.

Increasing Prosperity of Southampton.—The export trade of this port during the past three months has increased with a rapidity almost unparalleled. For the quarter ending 5th of April, 1840, the value of British goods exported was £19,000; for the quarter ending 5th of July, 1840, £26,000; for the quarter ending the 10th of October, 1840, £33 000; for the quarter ending the 5th of January, 1841, £25,000; making a total for the year of £103,000; whilst for the quarter ending 5th of April, 1841, the value of British goods exported from this port was £120,000, being an increase in one quarter over the whole of the preceding year of £17,000. In addition to the above £120,000 worth of British merchandise exported during the past quarter, there were also £25,000 worth of British silver coin, £5,000 worth of foreign silver coin, and about £40,000 worth of foreign goods from the bonded warehouses, making the actual total exports of the last quarter amount to £190,000. Of these goods, it may be observed, that about £70,000 were exported to the Channel islands, France, and the Mauritius, and the remainder in the Peninsular and Oriental Steam-packet Company's vessels to Lisbon, Gibraltar, Malta, and Alexandria. It is to this last important source of communication that we are in a great measure indebted for so rapid a rise in the rank of commercial towns.—*Hampshire Independent.*

Dreadful Explosion at Willington Pit.—(From the *Tyne Mercury* of Tuesday, April 20.) Just after we went to press yesterday afternoon a report became very prevalent in this town that one of those dreadful and fatal accidents had occurred at Willington colliery, which this neighbourhood has bad too frequently to deplore. We regret to state that the report has turned out to be too true. The loss of life has been awful, and the damage to property has been great. As yet the particulars of the occurrence cannot be gathered with any degree of accuracy; and the general alarm has been much increased by a supposition that the accident was of a much greater extent than it really is. The explosion took place yesterday afternoon at Willington colliery, which is situate about half-way between Newcastle and North Shields. We understand that the colliery had a threatening appearance some time ago, but all fears as to any danger were allayed. At the time of the explosion 34 men and boys were in the pit, 31 of these have lost their lives; three only escaped out of the number. Seven of the dead bodies have been removed, and exertions have been made for the recovery of the remainder. The pit itself is much shattered. The accident must be regretted by every person, and its effects will be to reduce many families to a state of poverty and dependency.

Fatal Accident from Machinery.—On Friday se'nnight a melancholy accident took place at the farm of Bucklivie, near Crossgates. A servant girl was feeding in sheaves to the thrashing-mill, when the rollers caught hold of her hands and dragged off both her arms at the shoulder. She lingered in great agony about three hours, and then expired.—*Caledonian Mercury.*

The British Queen Steam Ship.—We understand that it is true that an alteration was made in the paddle-floats of the British Queen and President previous to their last departure for America, which was rendered necessary by Mr. Galloway, the engineer, having obtained an injunction against the steam company for an infringement of his patent. The alteration, however, was of a trifling description, but was considered by several scientific gentlemen who accompanied the vessels down the river to be an improvement upon their speed, as well as tending to their safety.—*Standard.*

The President.—No tidings have yet reached us of this missing steamer. We may expect daily Her Majesty's steam-ship Dee, which is supposed to have sailed from Jamaica on the 14th of March, and was to touch at Antigua and Bermuda on her homeward route. It is understood that the above islands are the only places that the President steam-ship could make in the event of her running to the south.—*Standard*, April 22.

Gloucester and Berkeley Canal.—An adjourned general meeting of the proprietors of this company was held at the Canal Office, Gloucester, on the 14th instant, M. Pearman, Esq., in the chair, when a report was presented from the committee, in which they stated that "a falling-off had taken place in the revenue of the company during the last six months, as compared with the corresponding period of last year, but they believed that this depression in the trade was only temporary, and that the completion of the various railways would have an advantageous influence on the interests of the company. The committee had made arrangements for opposing the Severn Navigation Bill now before Parliament, from a conviction that its provisions would prove detrimental to the interests of the company, the expense of the opposition being equally borne by the canal company and the corporation of the city of Gloucester. The works of the canal were in good repair, and their cost of maintenance had decreased during the last six months. From the state of the income and expenditure of the company for the six months ending the 31st March last, it appeared that the receipts amounted to £9,305 7s., and the disbursements to £7,938 2s. 7d.; leaving a balance in the company's hands of £1,367 4s. 5d."

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Gardeners' Gazette.	People's Magazine.
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Lancet.	Railway Magazine.
Law Magazine (Monthly).	Railway Times.
Legal Observer.	Railroad Quarterly Journal.
Literary Gazette.	Repertory of Arts.
	Spectator.

ACTS OF PARLIAMENT.

PATTERNS,—
27 Geo. III., c. 38; 2 Victoria. c. 13; 2 Victoria, c. 17 (The last relates to patterns and *models.*)

PATENTS FOR INVENTIONS,—
2 and 3 Victoria, c. 67.

SCULPTURES,—
38 Geo. III., c. 71.

ENGRAVINGS,—
7 Geo. III., c., 38; 17 Geo. III., c. 57.

COPYRIGHT,—
8 Anne, c. 19: 12 Geo. II., (Booksellers' Act), c. 36; 15 Geo. III. (Universities' Act), c. 53; 54 Geo. III (General Copyright), c. 156.

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STATISTICS of SULPHUR.—The "MINING JOURNAL," published April 3, contained a valuable paper on the NATURE and PROPERTIES of SULPHUR; —On the uses to which Sulphur is employed—Refining of Sulphur from Earthy Mixtures—Extraction of Sulphur from Pyrites—Nature of the Residuum after expelling part of the Sulphur—Manufacture of Sulphuric Acid—Remarks on the useful employment of the Residue of Distillation. Besides the above, the Journal of this day will contain papers on Improvements in Steam-boiler Furnaces—Geological Structure of the Wealden District—Application of Dry and Wet Copper Assaying—On the Resources and Application of Coal—On the Purification of Gold—Description of the Great Coal Field, New Brunswick—Improved Plan of raising Mine Pumps (with Cuts)—Gold Mining in New Granada—Explosion of Steam-boilers attributed to Electricity—Anthracite Coal Trade of the United States—Colliery Instruction—On the Question of the Poor-rates chargeable on Mines in Ireland—On Dialling—Successful Application of Cast-iron Tubbing at Mandyke Colliery (with Cuts)—The Compass Needle for Mines, &c.—Reports from the English and Foreign Mining Districts—Reports of the Proceedings of Public Companies—Scientific Meetings—Money Market and City Intelligence—Prices of Mining and Railway Shares—Railway Traffic Returns—Latest Prices of Metals—Sales of Copper Ores and Black Tin—Specifications and recent Patents: with a variety of miscellaneous Scientific Intelligence, &c.—The "Mining Journal" is published every Saturday Afternoon, at the office, 37, New Broad-street, City (price Sixpence), and may be had of all Booksellers and Newsmen throughout the country.

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The HAGUE, for HOLLAND; BERLIN, for PRUSSIA; VIENNA, for the AUSTRIAN DOMINIONS; MUNICH, for BAVARIA; DRESDEN, for SAXONY; FRANKFORT, for the GERMAN UNION; ST. PETERSBURG, for RUSSIA, &c. &c. &c.

N.B. A Solicitor is in attendance, daily, from Eleven till Two o'Clock, who may be consulted on all points of Patent Law.

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THE

INVENTORS' ADVOCATE,

AND JOURNAL OF INDUSTRY;

A WEEKLY BRITISH AND FOREIGN MISCELLANY OF

SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

FIAT JUSTITIA, RUAT CŒLUM

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TIDES OF THE ATMOSPHERE.

It must naturally be suggested to every one who is acquainted with the effects of the moon's attraction on the waters of the ocean, that a similar action, to a much greater extent, must take place on the atmosphere, and that a great atmospheric wave must always follow the course of the moon. It appears to us an irresistible conclusion, that if water be attracted out of its ordinary level by the moon, the other rarer fluid which surrounds the globe must also be attracted by that body. There would not, we believe, remain the least doubt of such being the fact, were it not for a misconception of the effect which such an atmospheric wave would have on the pressure of the atmosphere. It is supposed, as we conceive most erroneously, that if a large volume of air were attracted by the moon, the weight of the atmosphere would be increased in those parts of the globe where this additional volume of air was collected, and that the recurring tides of the atmosphere would be indicated by the barometer. As no sufficient indications of the kind occur in that instrument, it is therefore concluded, by some, without due examination, that the moon's attraction can possess little or no influence on the atmosphere.

It requires, however, only a slight consideration of the effects which such an alteration would produce on the atmosphere to show that its pressure would undergo little or no variation by the increased altitude of the air, attracted by the earth's satellite. It must be borne in mind, that the atmospheric wave would always correspond in height and magnitude with the moon's attraction, and that if the attractive power be not sufficient to maintain the atmosphere above the uniform height, there would be no disturbance of its surface. In proportion, therefore, to the elevation of the atmosphere by the moon's attraction, is the power of that attraction to sustain the additional weight. The pressure of the atmosphere would not, consequently, be altered by the increase of the volume of air, however great it might be, for the attractive power which is adequate to raise that volume of air against the force of gravitation, would also be sufficient to counterpoise the attraction of gravitation.

When the effect of the moon's attraction on atmospheric pressure is thus considered, it seems at once self-evident; and the wonder is, that any difficulty should have arisen in the consideration of the moon's influence on the atmosphere from the absence of any variations in the barometer. Yet we find that this difficulty has arisen in most of the meteorological considerations of the subject that have engaged the attention of learned bodies. At the meetings of the British Association, and more recently at the meetings of the Royal Society, the question of the moon's influence on the atmosphere, and the absence of an indication of such influence by change of pressure, have afforded subjects of discussion, which, had this simple view of the question been taken, would have been speedily decided.

Assuming, then—as we think we have a right to do when this stumbling-block is removed—that the moon possesses influence on the atmosphere; the next question for consideration is, the extent to which its influence varies the uniform level of the air.

This is a question of great difficulty; and though there are several data on which to found calculations, they are all liable to be influenced by various circumstances, which must render such estimates in the present uncertain state of our knowledge exceedingly problematical. It is known, for instance, that the attraction of the moon on any particle of matter on the earth's surface is about one eighteen-millionth part of the attraction of gravitation. We know, again, that the average pressure of the atmosphere on the whole surface of the earth is estimated at 12,022,560,000,000,000,000 pounds. Supposing the moon's action to take place on one hemisphere only; then by dividing the above inconceivably large amount of pressure by two, and again by the comparative amount of the moon's attraction, we ought to arrive at some approximation to the amount of action which the moon possesses on the atmosphere. By this mode of calculation we ascertain, that the total amount of attraction on the atmospheric hemisphere exposed to the moon, operating against the force of gravitation, is equal to 149 millions of tons. Assuming this computation to be correct, we still have to ascertain the elevation of the atmosphere that would be caused by this amount of attraction on its aggregate volume. On this point we will not at present venture an opinion. It might, indeed, be supposed, that the action of the moon in raising the waters of the ocean would serve as a guide in solving this problem; but the unknown and varying depths of the sea prevent dependence being placed on what would otherwise afford a satisfactory index. We may conclude, however, with tolerable certainty, that the highest point of elevation is that more directly between the moon and the earth. That this must be the case will readily appear when we consider that the attractive power is exerted on a fluid body surrounding a spherical surface. The attraction must consequently act *through* the portion of the atmosphere nearer the moon, on those portions towards the boundaries of the hemisphere, and in a line not directly opposed to the gravitating power. A kind of cumulative attraction will, therefore, be exerted, tending to increase the volume of air immediately under the moon.

It follows as a natural consequence, of admitting that the atmosphere has its tides as well as the sea, that the height of those tides must vary like those of the ocean by the conjoined influence or the opposition of the sun and moon. The atmosphere must have its spring and its neap tides. There can be little doubt that these constant currents in the upper atmosphere perform important functions in the economy of nature, though we who live on the surface of the earth are as little conscious of their effects as the monsters of the deep are of the varying level of the waters above them. One great step in advance in this branch of meteorological science is to establish the fact, that these tides exist; respecting which doubt has arisen from the absence of indications that we have endeavored to show could not be reasonably expected. When this becomes an admitted fact, we have no doubt that researches founded upon this basis will lead to important discoveries relative to the laws which govern atmospherical phenomena.

THE EVAPORATIVE POWER OF COAL.

We now bring to a conclusion the abstract of Dr. Fyfe's important paper, on the evaporative power of different kinds of coal, the first portion of which we inserted in our last number. After stating the results of his experiments on Scotch coal, which were, that each pound of such coal is capable of producing heat sufficient to evaporate 6·22lbs of water, he thus proceeds to consider the evaporative power of anthracite:

"Anthracite of good quality burns with very little or no flame, and without smoke. When first thrown on the fire it decrepitates, and small pieces are thrown off from it, which choke up the spaces between the fire-bars and also the flues, and in a great measure prevent the combustion from going on. Though it can be burned in common grates,

yet, unless consumed in some particular way, it does not answer well for raising steam, owing to the slowness of the combustion.

"The method I adopted was to supply the coal with air previously warmed, by which the temperature was, on an average, about 350°. By this contrivance the decrepitation was almost entirely prevented, the combustion was rapid, and the steam was easily kept up. The anthracite I employed was of inferior quality; it contained not only a large quantity of ash, but also of volatile matter, the latter of which made it burn with flame, while the former, owing to the intense heat generated, formed at ough slag, which adhered firmly to the bars, and in a great measure retarded the combustion.

"As good anthracite burns with little or no flame, and as, of course, there is no bituminous matter, which causes the swelling of other kinds of coal, I found that the furnace bars must be brought nearer to the bottom of the boiler, than when Scotch or English caking coal is employed. In my experiments I had them generally at the distance of about eight inches. The fuel was in general about four inches in depth, and in stoking it was thrown as equally as possible over the whole surface of the fire.

"It is unnecessary to state the result of the numerous trials made after having satisfied myself that I had effected completely the combustion of the fuel. I will confine my remarks to one only, performed when the furnace was in good working condition, the pressure on the boiler being 17lbs. It was continued from ten in the morning till half after six in the evening.

"In this trial the total quantity of coal used was 448lbs., and the evaporation amounted to 3,560lbs.; there were, therefore, evaporated 7·94lbs. for each pound of coal. The evaporative power of this anthracite, when tried by the litharge test, was found to be 10 78, compared to that of carbon as 12·3.

"Now, $10{\cdot}78 - 7{\cdot}94 = 2{\cdot}84$, and $10{\cdot}78 : 2{\cdot}24 : 100 : 26{\cdot}34$; there was, therefore, a loss of 26·34 per cent, supposing the whole of the coal thrown into the furnace were consumed. The coal found in the ash-pit was 40·5lbs., thus making the quantity actually consumed amount to 407·5, which would make the evaporation 8·73 for each pound of coal undergoing combustion.

"Now, $10{\cdot}78 - 8{\cdot}73 = 2{\cdot}05$, and $10{\cdot}78 : 2{\cdot}05 :: 100 : 19$; there was, therefore, a loss of 19 per cent. of the total heat evolved, supposing the 407½lbs. fuel consumed to have undergone complete combustion. With the Scotch coal the loss amounted to 28·97 per cent.

"The next set of experiments was made with the view of ascertaining the evaporative power of English caking, compared with common Scotch coal. Of course, the strength of these must vary according to circumstances; the results now to be stated must, therefore, be considered as applying only to those on which the trials were made. The English coal used was imported at Leith, and said to be of the best quality; being got direct from the vessel, it may be considered as free from admixture. The Scotch coal with which it was compared was from the neighbourhood of Edinburgh, and is generally reckoned good."

The result of these experiments was that the actual quantities of water evaporated were 5·88 lbs. for each pound of Scotch coal, and 7·84 lbs. for each pound of English coal. This Dr. Fyfe considers may be regarded as a general average of the comparative evaporative qualities of those two kinds of coal. The compositions were found to be on analysis—

	Scotch.	English.
Moisture	7·5	1·5
Volatile matter	34·5	29 5
Fixed carbon	50·5	67 0
Ashes	7·5	2 0
	100·0	100·0

"On viewing the results of the experiments now detailed, one remarkable circumstance at once strikes us—it is the great practical evaporative power of anthracite over the other kinds of coal, which, though they contain less fixed carbon, yet have much more volatile matter—the hydrogen of which, I have already said, gives out thrice as much heat as carbon does. In the anthracite which I employed, the fixed carbon amounted to 71·4 per cent.; in the caking coal it was 67, and in the Scotch coal only 50 5. Now, with regard to the comparative practical evaporative power of the Scotch and English coal, I have stated them as 100 to 133, and as $50{\cdot}5 : 67 :: 100 : 132$.

"Again, with regard to the Scotch and anthracite. I have given the evaporative power as 6·66 to 8 73, and $50{\cdot}5 : 71{\cdot}4 :: 6{\cdot}66 : 9{\cdot}41$. Thus not only is the evaporative power in practice in the ratio of the fixed carbon, but there is a very remarkable approximation in the evaporate power to the proportion of this ingredient in each.

"In the anthracite the volatile matter, independent of the moisture, was 13·3; in the English it was 29·5; and in the Scotch it amounted to no less than 34·5 per cent. We would, therefore, naturally expect that the English and Scotch coal would have a greater evaporative power, whereas that which has the least of these volatile ingredients has the greatest. It is evident from this, that, in the combustion of fuel in furnaces as commonly constructed, the loss of the heat evolved is occasioned, in a great measure, by the volatile matters; much of these, we know, is consumed, but even in the best-constructed furnaces there is an escape of a considerable proportion, owing to the want of a due supply of air, or from want of the proper temperature, even though air is present; indeed, it is chiefly owing to the latter, for we never find that the air that has passed up through the fuel is entirely deprived of its oxygen."

The conclusion to be drawn from Dr. Fyfe's experiments is, that the evaporative power of coal depends on the fixed carbon, and that the volatile matter affords no available heat, as it requires as much heat to become gaseous before ignition, as is given out during the combustion. This is not, however, positively affirmed, it is only assumed as a probable inference. The Doctor thus expresses himself:—

"From the few experiments I have made, I do not feel that I am warranted in drawing it as a general conclusion, that the practical evaporative power will be found to be as the fixed carbon, but from what I have seen, I have every reason to think that it is either so, or very near it; of course, it will require a more extended series of experiments, made on a larger scale, before such a conclusion can be proved to be correct. The subject is important, and well worthy of further prosecution, and I trust that those who have opportunities for testing the practical evaporative power in furnaces properly constructed, will, from what I have advanced, have their attention drawn to it. Till this is properly tried, it is useless to enter into speculation regarding the heat evolved by combustible matter; at the same time, however, there is one point to which I cannot refrain from alluding. Whether or not it is found that the practical evaporative power is as the fixed carbon, it must be allowed that in the trials, the results of which I have given, it bears a close approximation to it; then a question arises—what becomes of the heat evolved by the combustion of the volatile ingredients? We know that the greater part of these is consumed, and they must give out heat by their combustion; if so, how does it happen that the evaporation is not greater than what should be occasioned by the consumption merely of the fixed carbon? This may, to a certain extent, be explained by the volatilisation of the elements that assume the gaseous form. When heat is applied to coal, by which it is made to unite with oxygen, and itself give forth heat, a part of that heat must be spent in enabling the hydrogen, with the equivalent proportion of carbon, to assume the elastic form. Now, if the whole of this was to escape without undergoing combustion, while, at the same time, the fixed carbon only is burned, we can easily conceive that the evaporative power of a coal thus consumed would be less than in the ratio of the fixed carbon it contains; but this is never the case in properly-constructed furnaces; a great part of the gaseous matters is consumed, and they, by their combustion, again evolve the heat which was absorbed by them when assuming the elastic form. Perhaps in furnaces as now constructed, even on the best principles, the whole, or nearly the whole, of the heat thus disengaged is so required; of course, the greater the proportion of volatile matters, the greater will be the abstraction of heat while they become gaseous, and, consequently, it will require the consumption of a proportional part to supply the heat thus abstracted. While, therefore, the heat evolved by the combustion of the fixed carbon is a fixed quantity in each fuel, and as, when the gaseous matter evolved is great, a proportionally smaller quantity of it is generally consumed —hence the lower evaporative power of those fuels containing much of the elements that yield the volatile matter; and, again, as it is much easier to effect the complete combustion of fixed carbon than of all the ingredients, both fixed and volatile, of a bituminous coal—hence the value of those that contain much of the fixed element, when consumed in furnaces as now usually constructed. I know that what I now assert is at variance with the opinions entertained on this point by practical engineers, who generally think that a great deal depends on the flame of the volatile matter. If, however, any reliance is to be placed on the experiments, the results of which I have detailed, I think they will be forced to allow that I am correct in what I assert—that the greater the proportion of fixed carbon in a fuel, the greater will be the practical evaporative power. In a national point of view, then, now that the demand for fuel has become so great, and that for long voyages it is of the utmost consequence to have the fuel powerful, so as to occupy as little space as possible, or rather, if I may be allowed the expression, to have a greater quantity of an evaporative power stowed away in the same space—it is of vast importance that attempts should be made to introduce the anthracite fuel."

CAST-IRON MANUFACTURES.

The following report relative to an improved mode of manufacturing cast-iron articles, by M. Bourbon Leblanc, of Paris, has been made to the Society of Encouragement, by a committee appointed for that purpose.

"The committee of chemical arts having been commissioned to examine the productions in refined cast iron presented to the society by M. Bourbon Leblanc, make the following report of the result of their trials:—

"Since Reaumur made known the fact that cast-iron when annealed with certain substances undergoes remarkable changes, and acquires properties which assimilated it to soft iron, and render it capable of being substituted for that metal for many purposes, numerous attempts have been made to apply this fact to the arts. The society has rewarded the exertions of Barndelle, and in England large establishments have been formed for carrying on processes which more or less resemble it. In France, also, exertions have been to realise the results obtained by Reaumur; but the modes of operating have varied; instead of merely annealing the pieces of cast iron, it has been, when in a state of fusion, mixed with substances intended to reduce it to a homogeneous state, and to give it qualities which render it more like soft iron.

"It is this kind of process that M. Bourbon Leblanc adopts to obtain the articles which he manufactures. The committee, without being acquainted with the nature of the substances which he mixes with the cast-iron, in order to give it the requisite qualities, has been present during the operation, and proved that the nature of the metal becomes modified in proportion to the number of refinings to which it is subjected. The operation may be either effected in crucibles, or

in ordinary furnaces. The cast-iron obtained by this means is easily moulded, takes a beautiful polish, has sharp edges, and possesses so much tenacity that different instruments, such as hatchets, chisels, hammers, and other implements, which have been used without any particular care, have resisted all the trials to which they have been subjected.

"The establishments founded either in England or France for manufacturing a variety of articles with refined cast-iron, after having been attended with more or less success, have all of them gradually ceased their operations, because it is considered a sufficient reason for depreciating all such productions, if some articles have occasionally a flaw which causes them to break easily; on the other hand it must be admitted that the very variable nature of cast-iron cannot fail to influence the productions of a manufactory in a very considerable degree; but we may be allowed to say, that cast-iron of very inferior quality, subjected to the treatment adopted by M. Bourbon Leblanc, appears to us to have acquired a degree of homogeneity which prognosticate regular results.

"The committee have no data relative to the price of the manufactures of M. Bourbon Leblanc. According to the statements that have been made by the inventor, the expense of refining would be considerably below the price of the materials, even when the operation requires many times repeating.

"If these results are correct, the proof of which can only be decided when the manufacture is worked on a large scale, if the productions are always the same, the process of M. Bourbon Leblanc may be of essential service to the iron manufactures."

THE SHAWL MANUFACTURE OF FRANCE.

(*Abridged from the Paris Journals.*)

One of the brightest productions of France, the one which has perhaps displayed most conspicuously the manufacturing genius of our country, occupying sixty thousand workmen, and throwing every year into circulation a capital of 40,000,000 francs, the shawl industry, is alarmed, and dreads an unexpected competition. It also calls upon the Government to protect it against foreign countries which threaten its very existence.

Let us first bestow a few words on the manufacture itself; it will enable us to judge more correctly of the evil it labours under, and of the efficacy of the remedy it demands.

The shawl, as is well known, derives its origin from India, and the valley of Cachmere is still the head quarters of a large manufacture which finds its *débouches* in Southern and Western Asia. In none of those countries do the women wear the shawl as clothing; it is to them a splendid ornament, an elegant drapery, which they twist round their heads, fold upon their arms, or gracefully throw *en sautoir* when it is reduced to the dimensions of a scarf. When it is of a larger size the Mahomedans wear it as a turban and a sash. That handsome, soft, warm, and delicate tissue is covered with a profusion of odd drawings; the extravagance of the lines, the wild confusion of the subjects—flowers, fruits, vegetables, animals, articles of furniture, edifices and figures often heaped together promiscuously—display, nevertheless, a marvellous knowledge of colors dexterously combined, lively and excessively glaring were they not softened down by the artifice of a delicate *liseré*, which supplies the *contours* of each subject and forms imperceptible transitions. The Hindoo weavers work those subjects with the spindle. At least, it is supposed so, for, in reality, the India shawl is not a tissue such as we understand it, but a net-work (*réseau*), a sort of net with very tight meshes; a real embroidery, made by detached portions, then put together, and frequently very unskilfully adapted to one another.

There still prevails a well kept secret as to the process of this manufacture. The only document that can shed light on it is a sort of estimate, drawn up in the local language, sent by General Allard to the French Government, officially translated by M. Jonannin, and published by the jury of the last exhibition in its report. The clearest thing in that document is that in the country itself a long shawl requires eight months of labor, and costs the principal manufacturer between 2,400 and 4,000 francs. Now, the facts we are about to set forth prove either that our distinguished countryman has been mystified, or that the India shawl manufacture has within a short period experienced a complete revolution.

If from the valley of Cachmere we come back to Europe, we find that the first India shawl made its appearance in France on the return of the expedition to Egypt. It produced a great sensation in the elegant world and among the manufacturers of woollen shawls, which were then plain, very insignificant, with wretched little borders tacked to them.

Some makers of the first order, laboured night and day to imitate the India shawl with the first raw materials received from Asia by Moscow, and they succeeded after overcoming incredible difficulties. The marvellous machine of Jacquard came to their assistance, and there was so much manufacturing science bestowed upon that copying achievement, that it may be considered a real creation in which neither Germany or England has been able to follow us. The whole of Europe from that moment ordered of us Cachmere shawls as fine as those of India, but of a lower price. We believe that, at present, our Paris manufacturers, the only ones that make the shawl *de luxe*, can supply for 800 francs articles of the most finished execution; they can produce also very handsome ones at the price of 500 francs.

But the shawl manufacturers fell from the first into an egregious error. Though obliged to create their processes, they resigned themselves constantly, for all the rest, to enacting the part of servile copiers; for the finest French shawl is, after all, but an imitation of its Indian prototype. No doubt this counterfeiting has nothing dishonest in it; nevertheless, like all things of that nature, it was accompanied with difficulties which could not fail to manifest themselves at a period more or less remote. To encourage the French manufacture, the importation of India shawls was completely prohibited, a measure most useless and unreasonable, for our manufacturers, in want of patterns, and not daring to depart from the India style, commenced smuggling, which they have now good reason to condemn. A large seizure is on record, which took place at the custom-house of Blanc Misseron, and which had a very singular *dénouement*. M. Decaze, then Minister, permitted drawings of those beautiful shawls to be taken at Blanc Misseron, and they were re exported immediately after. But the sketches did not suffice, and smugglers took care that the originals should not be wanting. All the shawls found their way back to France, and copies which bear the name of Blanc Misseron might still be found in the trade. We know but of one original, or nearly original, French shawl; it is a *chef-d'œuvre* of the painter, M. Coudere, and of M. Gaussen, the manufacturer, but even this *chef-d'œuvre* has not ventured to depart from the India style; there is still the same Oriental plants and flowers, animals, edifices, soldiers, and sultans of India. Ternaux, that eminent manufacturer, had indeed perceived the radical vice of that art. With the assistance of Isabey's graceful pencil he attempted another style, but he did not then succeed. The manufacturing processes were as yet very imperfect, and did not second him, and this is so true, that the way of putting together the *sillon du fond* with that of the *broché* was not yet known. Besides, the Oriental shawls were sold for their weight in gold; there was, therefore, in it a question of vanity, and at least an anxiety to look opulent. This prestige has long vanished, and it may now be said that there is a satiety of the India styles. It is taken for want of a better one, and if the real authentic Cachmere is now preferred at an equal price, it is because, whether right or wrong, it is believed the most durable as regards both fabric and colors. The French shawl had been well received because it proved at length a substitute for the old *mantelet*.

Something mysterious seems to be now passing in the manufacturing world; we Frenchmen formerly sent some of our Cachmeres to England, which sold for Indian shawls so long as the trick was not detected; and at present the East India Company publicly sell in London genuine India shawls at a fifth of their old value, and at a price which nearly reaches that of our shawls. The petition of the French manufacturers asserts it, the Customs' committee avow it, and smugglers, reckless of the present duty of 80 francs upon square, and 150 francs on long shawls, import an enormous quantity of those shawls into France. 2,144 of those valuable fabrics which had left our *entrepots* for Bâle, Geneva and Chambery, renewed in the year 1839 the Blanc Misseron adventure, and re-entered France every one of them! To remedy what they consider a most threatening state of things, the manufacturers, who consider themselves "lost" and "annihilated" unless the Government afford them efficient assistance, would have a duty of 1,000 francs laid on every foreign shawl, which would be equivalent to another prohibition. Moreover, they would have a stamp and number affixed to every shawl paying the duty, another stamp put to all those now existing in the warehouses, and the seizure of all shawls that shall not have been stamped within a certain period.

SILK GROWN IN ENGLAND.

In the last part of the Transactions of the Society of Arts, London, the following account is given by Mr. W. Felkin, of Nottingham, "On Silk Grown in England," and at the time the paper was received specimens of cocoons were presented, which have been placed in the society's repository.

The place where the experiment was carried on, was a warehouse in the middle of the town of Nottingham; the worms were hatched from eggs procured in Italy, of two varieties, distinguished by the color of the silk, one being white, and the other yellow. The eggs of the worms producing the white silk were hatched in the beginning of May; and in consequence of the severity of the weather were obliged to be fed during the first fortnight on lettuce leaves. The eggs of the worms producing the yellow silk did not hatch till a fortnight after the others; and were fed from the beginning on mulberry leaves. Of the white silk-worms, seven eighths died; of the yellow silk-worms, the loss amounted only to forty per cent.; the average casualty of the worms in France, under the best management, being about thirty five per cent. The yellow silk-worms were arranged in two divisions; those in one of which began to spin earlier than the others, were more healthy, and suffered a loss of less than twenty per cent. The weather for the first three weeks of the experiment was dry and cold; for the next fortnight was fine; and for the remainder of the time so very wet, that it was not possible at all times to avoid giving the leaves in a heated state. The temperature of the room varied from 55° to 70°.

In Italy, the worms begin to spin about six weeks after hatching. In Mr. Felkin's experiments, the yellow silk-worms, which, for the first fortnight, had been fed on lettuce, did not begin to spin until all the others had finished; and they had not finished till three weeks afterwards—the time from hatching till finishing the cocoons being eleven weeks.

Mr. Felkin's cocoons, on comparison with some recently imported from Italy, presented but little inferiority in compactness and size; for, while of the latter about 250 weighed a pound, of the former 300 weighed a pound.

The general conclusion which Mr. Felkin draws from his experiment is, that the growing of silk in England is not likely to be a profitable undertaking.

In order to ascertain how far it is desirable to reel silk in England from cocoons of foreign

growth, Mr. Felkin states some particulars respecting an experiment on a very large scale, made by Mr. Heathcot, at Twirton, and superintended by Mr. Felkin.

The cocoons were Florentine, and weighed 35,000 pounds. The quality of the silk was good, and it was made by Mr. Heathcot into bobbin-net lace. Part of the cocoons were employed in various experiments; the remainder, 28,000 pounds, produced 1,850 pounds of reeled silk; but the profit of the undertaking was not such as to induce a repetition of it. It was also found that the girls employed in reeling, suffered much in their health during the process; which is attributed by Mr. Felkin to the great heat of the water necessary to swim the cocoons in, and into which the reelers were, of necessity, continually dipping their fingers.

One girl died; and the others suffered much from rheumatism and abscesses in the fingers and arms.

Besides the results of Mr. Felkin's own personal experience above described, his communication contains many very valuable facts respecting the growth of silk in Europe, as well as suggestions for improving the growth of silk in British India.

PATENTS.—BRITISH AND FOREIGN.

MONTHLY LIST OF NEW PATENTS.

James Tildesley, of Willenhall, Stafford, factor, and Joseph Sanders, of Wolverhampton, lock-manufacturer, for *improvements in locks.*—6 months, March 29.

George Evans, of Dorset-place, Marylebone, for *an improvement or improvements upon trusses for the relief of hernia.*—6 months, March 29.

Alexander Parkes, of Birmingham, artist, for *certain improvements in the production of works of art in metals by electric deposition.*—6 months, March 29.

John Lindsay, esq., of Lewisham, for *improvements in covers for water-closets, night stools, and bed-pans.*—6 months, March 29.

James Furnival, of Warrington, currier, for *an expeditious mode of unhairing, and tanning various descriptions of hides and skins.*—4 months, March 29.

Thomas Gore, of Manchester, machine-maker, for *certain improvements in machinery or apparatus for roving, spinning, and doubling cotton, silk, wool, and other fibrous materials.*—6 months, March 30.

John Ham, of Chard, Somerset, machinist, for *improved machinery or apparatus for making or manufacturing netted fabrics.*—6 months, March 31.

William Jenkinson, of Salford, machine-maker, for *certain improvements in machinery for preparing and spinning flax, silk, and other fibrous substances.*—6 months, March 31.

Joseph Gaury, of Watling-street, warehouseman, for *a parachute to preserve all sorts of carriages using axletrees, from falling or injury, upon the breaking of their axletrees.*—6 months, being a communication, March 31.

John George Bodmer, of Manchester, engineer, for *certain improvements in the construction of screwing stocks, taps, and dies, and certain other tools or apparatus, or machinery, for cutting and working in metals.*—6 months, April 3.

James Ogden, of Manchester, cotton spinner, and Joseph Grundy Woolland, of Manchester aforesaid, commission agent, for *certain improvements in looms for weaving.*—6 months, April 3.

William Edward Newton, of Chancery-lane, civil engineer, for *certain improvements in the process, mode, or method of making or manufacturing lime, cement, artificial stone, and such other compositions, more particularly applicable for working under water, and in constructing buildings and other works which are exposed to damp.*—Being a communication, by writ, &c., April 3.

Zacharia Bryant, of the town of Nottingham, machinist, for *an improved method of manufacturing cloth and other fabrics, from woollen, cotton, flax, silk, and other substances.*—6 months, April 3.

James Anderson, of Newcastle-upon-Tyne, for *improvements in windlasses.*—6 months, April 5.

William James Barsham, of Bow, Middlesex, gent., for *improvements in fastening buttons and other articles on to wearing apparel, and other descriptions of goods or manufactures.*—6 months, April 5.

Henry M'Evoy, of Graham-street, Birmingham, hook and eye maker, for *improvements in fastenings for bands, straps, and parts of wearing apparel.*—6 months, April 5.

Jonathan Beilby, of York, brewer, for *improvements in brewing.*—6 months, April 5.

William Hutchinson, of Sutton-on-Trent, seed crusher and oil-cake manufacturer, for *certain improvements in the manufacture of oil-cake or seed-cake*—6 months, April 5.

William Littell Tizard, of Birmingham, brewer, for *certain improvements in apparatus for brewing.*—6 months, April 5.

Joseph Wilson Nuttall, of Belper, draper, and Henry Holden, of the same place, tailor, for *improved apparatus to be attached to trousers, commonly called trouser straps.*—6 months, April 5.

Joseph Apsey, of Cornwall-road, Lambeth, engineer, for *improvements in the construction of flues for steam-boilers, and other furnaces.*—6 months, April 6.

Christopher Edward Dampier, of Ware, gent., for *improvements in weighing machines.*—6 months, April 15.

Frank Hills and George Hills, of Deptford, manufacturing chemists, for *certain improvements in the manufacture of sulphuric acid and carbonate of soda.*—6 months, April 17.

Henry Augustus Wells, of Saint John's-wood, gent., for *certain improvements in the manufacture of woollen cloth.*—6 months, April 17.

Peter Kendall, of Gifford's-hall, Suffolk, Esq., for *an improved method or methods of connecting and disconnecting locomotive engines and railway carriages.*—6 months, April 17.

Joseph Barker, of Regent-street, Lambeth, artist, for *improvements in measuring aeriform or fluid substances.*—6 months, April 20.

Joseph Bentham, of Bradford, weaver, for *improvements in weaving.*—6 months, April 22.

Henry Brown, of Codnor Park Iron-works, Derby, iron-manufacturer, for *improvements in the manufacture of steel.*—6 months, April 22.

Thomas Harris, of Hales Owen, near Birmingham, horn-button manufacturer, for *improvements in the manufacture of what are called horn buttons, and in the dies to be used in the making of such description of buttons.*—6 months, being partly a communication, April 22.

Humphrey Jefferies, of Birmingham, button-maker, for *improvements in the manufacture of buttons.*—6 months, April 22.

John Rostron, of Edenfield, Lancaster, manufacturer, and Thomas Welch, of Manchester, manufacturer, for *certain improvements in looms for weaving.*—6 months, April 22.

Floride Heindryckx, of Fenchurch-street, engineer, for *certain improvements in the construction and arrangement of fire-places and furnaces, applicable to various useful purposes.*—6 months, April 24.

Lancelot Powell, of Clydach Works, Brecon, iron-master, and Robert Ellis, of Clydach, aforesaid, agent, for *certain improvements in the manufacture of iron.*—6 months, April 24.

Thomas Robinson, of Wilmington-square, gent., for *improvements in drying wool, cotton, and other fibrous materials, in the manufactured and unmanufactured state.*—6 months, April 27.

William Petrie, of Croydon, Surrey, gent., for *a mode of obtaining a moving power by voltaic electricity, applicable to engines and other cases where a moving power is required.*—6 months, April 27.

Alexander Southwood Stocker and Clement Heeley, both of Birmingham, manufacturers, for *certain improvements in patten and clog ties, and other articles or fastenings of dress.*—6 months, April 27.

Benjamin Rankin, of College-street, Islington, gent., for *a new form and combination of, and mode of manufacturing, blocks for pavement.*—6 months, April 27.

Osborne Reynolds, of Belfast, Ireland, clerk, for *improvements in paving streets, roads, and ways.*—6 months, April 27.

Andre Dronot de Charlien, of Coleman-street-buildings, gent., for *improvements in preparing matters to be consumed in obtaining light, and in the construction of burners for burning the same.*—6 months, being a communication, April 27.

ENGLISH EXPIRED PATENTS.

James Whitaker, of Wardle, near Rochdale, for *improvements in carding and spinning machinery,* April 24.

Carlo Chigo, of London, for *improvements in weaving machines,* April 24.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(Continued from page 261.)

Charles Parker, of Darlington, Durham, flax-spinner, for *improvements in looms for weaving linen and other fabrics, to be worked by hand, steam, water, or any other motive power,* April 22.—Claim first — The mode of combining three rollers for giving off the warp in looms.

At the lower part of the back of the loom are placed three rollers, viz., two revolving rollers and an intermediate one; the two revolving ones are covered with woollen cloth, and one of them being caused to revolve by gearing from the main shaft of the loom, communicates its motion to the other by means of a toothed wheel fixed on the axis of each, there being a small pinion between the two wheels, by means of which they both revolve in the same direction. The warp threads from the warp roller or rollers are passed round these rollers, thence over a roller at the top of the loom, and are then fastened to the cloth beam. The advantage to be derived from this arrangement is, that the warp threads will be given off from the warp rollers with a more steady and uniform motion than usual.

Claim second.—The mode of taking up the work or fabric by self-adjusting weights and levers.

On the end of the cloth beam (which is at the lower part of the front of the loom) is fastened a worm wheel, which is driven by a worm, formed on one end of a horizontal shaft, extending towards the back of the loom; at the other end of this shaft are two cog-wheels, turning loosely on the shaft, and alongside of each cog-wheel is a ratchet-wheel fixed to the shaft, being turned by a driver or click from the cog-wheel when it is turned in one direction, but on its being turned in the other direction, the inclined surfaces of the teeth of the ratchet-wheel allow the click to slide over them. The cog-wheels are turned by means of racks, formed on two vertical rods, which are suspended by pin-joints from horizontal levers at the top of the loom; the lower ends of the rods are forked, and receive between their forks a stud, which projects from the side of a cam, by means of which the rods are caused to rise and fall; there being two cams, one to each rod, which are so arranged on their axis that one rod will be descending while the other is rising. The descent of one rod turns the horizontal shaft half way round; then that rod ascending, the other rod descends, and turns the shaft round the remain-

ing distance: thus a continuous rotary motion is given to the horizontal shaft, which by means of the worm and worm-wheel is communicated to the warp beam; the ascending motion of either of the rods has no effect on the horizontal shaft, as on the rising of either of them the cog-wheel which it drives turns freely on the shaft as before described.

The two horizontal levers at the top of the loom before-mentioned are hollow, and have each a slot in their underside, running along their whole length; within each lever is a screw, to which a slow revolving motion is given, and suspended from this screw is a weight, which passes through the slot, and hangs below the lever; by the revolving motion of the screw this weight is caused to traverse from the part of the lever nearest its axis to its extreme end, by which means a continually increasing leverage is obtained for winding up the cloth beam, which is gradually increasing in size.

Claim third.—The mode of stopping a loom by means of apparatus applied to a shuttle and shuttle-box.

This part of the improvements consists in a peculiar arrangement of parts, by means of which the loom is stopped whenever a weft thread breaks or fails.

The weft thread passes first from the bobbin through a ring in the shuttle, and then through a hole in one end of a horizontal lever, which is constantly urged to protrude through an opening in the side of the shuttle, by means of its spring, but is kept from so doing by the tension of the weft thread, as long as the same remains whole, but as soon as the weft thread breaks or fails, the end of the lever, being free, projects through the side of the shuttle, and on its entering the shuttle-box forces back one end of a small lever, which by means of another one liberates a spring lever, and this last turning towards the front of the loom causes a forked rod attached to it to remove the driving band from the fast on to the loose pulley of the main shaft, and thus stop the loom.

Claim fourth.—The mode of changing the shuttle by means of the apparatus herein described.

The shuttle-box is composed of a drawer having two cells in it, in one of which is a spare shuttle, and this drawer is constantly pulled in one direction by a band, but is at the same time prevented from moving in that direction, by a spring. On the shuttle entering its cell, the weft thread having either broken or failed, the horizontal lever which protrudes through the side of the shuttle will strike against one end of a short lever, the other end of which, drawing back the spring, releases the drawer, which is immediately pulled forward, thereby substituting the cell containing the spare shuttle for the cell that contains the shuttle previously used.

Thomas Clark, of Wolverhampton, Stafford, iron-founder, for *certain improvements in the construction of locks, latches, and such like fastenings, applicable for securing doors, gates, window shutters, and such like purposes*, (being a communication,) April 22.—This invention consists in the substitution for the springs generally used, of weights or weighted levers, in order to keep the bolts of the lock in a proper position when shot or unshot.

Claim.—The substitution of weights or weighted levers for springs, in the construction of locks, latches, and other fastenings, in the manner herein described.

In this lock only one tumbler is used, (though more tumblers, or none, may be used, according as the lock is required to be more or less secure). The tumbler turns on an axis behind the key-hole of the lock, and on this axis one end of a weight or weighted lever also turns, the other end extending towards the front of the lock having a stud on its upper part and one on its centre. The lock-bolt has two notches cut in its upper part, one considerably longer than the other, being divided from each other by a small projection; there are likewise two openings in the centre part of the bolt, communicating with each other by a slot; into the top notches the upper stud enters, and into the centre openings the lower stud enters, the two studs being in the notches and openings nearest the front of the lock-bolt, when the lock is in a quiescent state.

On the key being turned half-way round, it raises the tumbler and likewise the weighted lever with its studs, the lower one of which is thus brought opposite to the slot that communicates between the two openings; and the upper one is raised out of the notch it was in, and stands just above the small projection that divides the two notches. The key is now turned round the remainder of the distance, by which means the bolt will be shot, and the tumbler and weighted lever will descend. The upper stud of the lever having passed over the small projection and entered the larger notch, and the lower stud having passed through the slot into the other opening, they will both tend to keep the bolt in its position, till it is again acted on by the key.

The latch-bolt is fastened to the lighter end of a weighted lever, which is suspended from a suitable axis at the upper part of the lock, the heavy end extending towards the back of the lock; the handle of the lock is provided with two small levers, which on turning the handle raise the heavy end of the lever, and so draw back the lighter end and the latch-bolt which is attached to it.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page* 262.)

Richard Edmunds, of Banbury, Oxford, gent., for *certain improvements in machines or apparatus for preparing and drilling land, and for depositing seeds and manure therein*, April 22.—Claim first.—A machine for pressing and preparing land for sowing corn, grain, seeds, or manure, in which a number of pressing rollers are employed, each roller being mounted on a separate axle, so that they may yield to any inequality in the surface of the ground.

A horizontal bar extends through the machine from side to side, the axles of the two running wheels being formed on the ends of it; along this bar are hinged a number of forked levers, the other ends of which carry the axles of the pressing rollers (which have angular edges as usual, in order to form angular grooves in the ground for the reception of the seed), each roller revolving within the forks of its own lever; the levers are each provided with a scraper, in order to remove the earth that might stick to the rollers. By this arrangement the pressing rollers can rise or fall according to the inequalities of the surface of the ground, independently of each other, and may likewise be weighted if desired, by attaching weights to their axles.

Claim second.—The use of a long bar or plate, for the purpose of simultaneously regulating the escape of grain in drilling machines, from all the apertures, and the mode of propelling and guiding the machines.

The lower part of the hopper of the drilling machine is pierced with a number of apertures for the passage of seed, and in front of these apertures a long bar or plate moves in grooves, having a corresponding number of openings in it. By moving this bar backwards or forwards by means of a screw and nut, the apertures are either enlarged or contracted, and the escape of the grain increased or diminished.

In order to propel and guide "hand drilling machines" two rods are used, one of which is attached at one end to the machine just behind the wheels and at right angles with the axles thereof, the other is attached at one end to the machine, and at the other end to the first rod, being at an angle of 45 degrees with the same. By this improvement the placing of sticks at certain distances all along the field in order to assist in guiding the machine is dispensed with, all that the man has to do (who guides and propels the machine by means of a handle attached to the end of the first rod) being to keep the wheel that is before him in the furrow.

Claim third.—The improved constructions of drilling machines herein-after described, and the manner of regulating the supply of grain through all the apertures simultaneously.

The hopper of the machine is pierced as before with a number of apertures, from which the grain is received on a notched wheel; by this wheel it is gradually poured through funnels into the angular grooves in the ground, formed by the pressing machine above described. The supply of grain is regulated by the following:—On one side of each of the apertures in the hopper is a fixed side piece, and extending across the machine from side to side is a bar which carries a like number of side pieces, so that by moving this bar backwards or forwards, the passage for the grain is either enlarged or diminished.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 3d of July.

Anthony Bernhard Von Rathen, of Kingston-upon-Hull, engineer, due June 22.

Richard Coles, of Southampton, slate merchant, due June 23.

Benjamin Baillie, of Henry street, Middlesex, due June 23.

John Brumerell Gregson, of Newcastle-upon-Tyne, Northumberland, soda-water manufacturer, due June 23.

Frederick Payne Mackelsan, of Birmingham, and James Murdoch, of Hackney-road, civil engineers, due June 23.

George Thornton, of Brighton, civil engineer, due June 23.

John Dickenson, Esq., of Bedford-row, due June 23.

David Walther, of Angel-court, Throgmorton-street, merchant, due June 23.

John Jones, of Leeds, brush manufacturer, due June 23.

Joseph Barker, of Regent-street, artist, due June 23.

FOREIGN INTELLIGENCE.

FRANCE.

ACADEMY OF SCIENCES.

The following notice of the proceedings of a recent sitting of the French Academy of Sciences is translated from the *Journal des Debats*, which usually presents a well condensed report *raisonné*, in which the facts stated are discussed by the reporter, Dr. A. Donné.

"We previously alluded to an animated discussion which took place during the last sitting of the Academy between Messrs. Chasles and Libri; we will now report the object of that discussion. M. Chasles had presented a catalogue of shooting stars for six centuries, 538 to 1123, according to which it would seem that the shooting stars appearing now periodically every year in Nov., were then visible in February, afterwards in March, then in April, &c., which would indicate a considerable alteration in the orbit of these small celestial bodies, if, indeed, shooting stars are really, which is very doubtful, solid bodies revolving in space, as M. Arago supposes. In reference to this communication M. Libri remarked that M. Chasles ought to have taken into account the alteration in the calendar, in order to indicate the number of shooting stars in each month. M. Chasles did not in the first instance consider that the alteration in the calendar was applicable to the object he had in view; but at the ensuing sitting he demonstrated that the correction of the Gregorian calendar was corroborative of the truth of his hypothesis, instead of contradicting it, as M. Libri had asserted. M. Chasles defended himself very well in this discussion, and proved that he required no assistance from any one to support his opinions.

"The nature of Saturn's ring was also considered in this discussion; but on this subject there are so

many hypotheses, and the nature of the shooting stars to which this singular satellite is compared is so little known—all that astronomers say of them, not excepting those of the Institute, is so contradictory, and science has for many years been embarrassed with erroneous observations respecting them —that this subject may be discussed for ever without being understood.

"M. Rozet read a paper on the irregularities in the structure of the terrestrial globe. According to this statement there exists very decided irregularities in the general form of the globe, not only in the solid parts, but on the surface of the seas; so that depressions are observable in certain parts of the waters, and elevations in others.

"M. Gannal read a paper on the preservation of alimentary food, accompanied by numerous specimens in support of his plan, such as legs of mutton, game, fowls, &c.

"M. Pelletan read a paper on a new method of evaporating fluids.

"M. Dutrochet continues his researches on the phenomena presented by camphor when brought in contact with water; the experiments are ingenious, and the facts which he reports are singular. This experienced observer feels convinced that a small piece of camphor placed at a certain distance from water, *without touching it*, produces a similar effect on the water to that produced by immediate contact with camphor.

"The surgical operations on squinting, stammering, &c. are carried on with unabated activity. What is said and done on this subject may perhaps be a little exaggerated; but experience is gained every day; facts become more numerous; they are classed; difficulties are removed; and the basis of this part of the science is beginning to be established. The operation on squinting is a decided acquisition to science; an accumulation of new facts is corroborative of former ones, and it is the details alone that are now discussed; viz., the causes of squinting, and the exceptions to the method of performing the operation, the advantages or disadvantages of the instruments used by different operators, &c.

"The question is, whether the operation for stammering will be attended with similar results; on which subject M. Amussat is making a series of experiments with great zeal, and which have been attended with some satisfactory results. We have great hopes, but we dare not speak decidedly; the result in this case being less clear and less capable of being appreciated than in squinting. We shall wait till well-established cases of cure are more numerous, that we may mention what we have witnessed, and express our opinion; but meanwhile let us say, in order to convey to our readers some idea of the zeal which actuates surgeons who are interested in the subject, and of the fertility of their imagination, that M. Guerin has conceived the idea of applying the surgical method of treating squinting to the cure of "short-sight" and of remedying that infirmity by the section of some muscle in the eye. We do not know whether he will find many advocates of this method; perhaps for some years longer spectacles may be preferred to the surgeon's knife; but it is certain that M. Guerin has presented individuals to M. Arago, the distance of whose sight after the operation has been singularly extended. It will be curious to prove the changes produced by the adoption of this plan on the organ of vision. M. Guerin has made this study the subject of a paper addressed to the Academy. M. Phillips sent some observations on the same subject; and M. Bonnet, chief surgeon of the Hotel-Dieu at Lyons, submitted to the judgment of the institute a paper on the treatment of short sight, by an incision of the small oblique muscle at the point where it is inserted into the orbit of the eye. In short, that nothing may possibly be omitted on this subject, M. Phillips has just applied the same method in the treatment of certain deformities of the mouth.

"The committee appointed for awarding prizes in medicine and surgery, having made their report on the different papers addressed to the assembly, awarded a prize of 6,000 francs to the work of M. Fanquerel des Planches, on the diseases occasioned by the exhalations from lead; an encouragement of 4,000 francs to M. Amussat, for his researches on the accidental introduction of air into the veins; and a physiological prize to M. Chaussat, for his valuable experimental researches on inanition."

SOCIETY OF INDUSTRY AT MULHAUSEN.

At the monthly meeting on the 31st March, M. Emile Dollfus, the president, made a report in the name of the mechanical committee, on a reckoning dial presented to the society by M. B. E. Saladin, from Messrs. André, Koechlin, and Co.

Another report was read, presented by M. B. E. Saladin in the name of the mechanical committee, on a model of an expanding spiral pulley, presented to the society by M. J. J. Bourcart, of Guebwiller. The reporter examined at great length the merits of different expanding pulleys, or pulleys with a variable movement, of different constructions more or less known, of which he produced drawings and descriptions.

M. J. Ochs, jun., in the name of the committee of chemistry, read a paper, which referred to the various experiments made by the members of that committee on the useful and comparative effects of heating dye-houses with steam. This paper, containing an account of the experiments made on a large scale in many manufactures, presented many very interesting results.

M. C. Dollfus, resident member of Augsburgh, who was present at that day's sitting, announced that he had made similar experiments, making use of turf for fuel instead of coal. The president requested M. Dollfus to communicate to the society the result of his observations, that a comparison might be formed between the two kinds of fuel, and that it might be made public at the same time as those of the experiments with coal.

The proprietors of lands and railway shareholders in France have, as in this country, been obliged to appeal to juries to settle the widely differing estimates set by either party on the value of the land required for railway purposes. At Valenciennes a jury was summoned to determine the conflicting valuations in the districts of Ounaing and Crespin. The offers of the railway directors for the land required in the two communes amounted to 180,000 frs.; the demands of the proprietors were twenty per cent. above that amount. In most cases the disputes were settled without appealing to the jury; in others, the jury awarded less than the sum offered; and in no case was more than seven per cent. above the price offered awarded.

The *Revue Scientifique* contains an article written by M. Saigey in reference to the thermometrical observations made at the Artesian well of Grenelle, by Messrs. Arago and Walferdin, in which M. Saigey endeavors to prove, by certain calculations, that the results of the observations of the temperature at the bottom of Artesian wells cannot represent the temperature of the strata at that depth. He maintains that in order to determine a depth corresponding to an increase of one degree of temperature it would be requisite to make simultaneous observations at different depths, then to divide the sum of the depths by the sum of the increase of the temperature. M. Saigey comes to the conclusion that the observations of Messrs. Arago and Walferdin in the well at Grenelle are far from satisfactory as regards the degree of heat at different depths.

The use of coal fuel in houses instead of wood is rapidly increasing in Paris. The severe cold of the past winter tended greatly to facilitate the employment of the more heat-producing fuel. The antipathy of the Parisians to coal is beginning to disappear, and they only require better kinds of grates for burning it to render its use almost general. At present they burn the coal mixed with wood.

BELGIUM.

It is stated in a recent letter from Maestricht, that one of the passage-boats from that town to Bois-le Duc, owing to its defective construction, capsized on the river with fifty passengers on board, who were rescued by the assistance of the other boatmen.

FINANCIAL STATEMENT OF THE BELGIAN RAILROADS.

The Brussels paper *L'Emancipation*, gives the following abstract and commentary on the financial report of the Minister of Public Works, relative to the expense and income derived from the railroads in Belgium.

"As the total amount of the expense of constructing the 113 leagues of Belgian railroads, and the average price of each league of the different sections is ascertained, as it is known what are the receipts which the traffic produce, and the expenses which attend the working, we shall again make a statement of the comparative balance of the clear profits with the capital of the establishment.

"The totat amount of the expenses of working from May 1835 to the 31st of Dec. 1840, amounts to the sum of.................... 10,626,477 frs.

"The receipts during the same period were.................... } 15,193,938

"From this it appears that to the 31st of Dec., 1840, the railroad had supplied the treasury, making allowance for the expense of repairs of transports and receipts, with a clear profit of.................... 4,567,461

"The sum total accumulated gradually as follows:—The receipts exceeding the expenses were in—

1835	100,224 frs.	77c.
1836	393,997	18
1837	226.994	12
1838	342,777	00
1839	1,165,414	76
1840	2,338,053	66

Total surplus ....4,567,461 frs 49c.

"If this surplus is compared with the capital engaged each year, the interest of which it ought to cover, the result of each year will be found to be very different; but it must not be forgotten that the receipts of the railroad are in proportion to the number of the stations to which the lines are extended, and that during the years when great works were in progress, before the sections that were opened reached the great centres of population or manufacture, the receipts compared with the expenses were very small.

"In 1835 the total average of capital employed in the formation of sections in progress, that is, half the two sums expended, one at the beginning of the year, and the other at the conclusion, was from 1,285,854 frs. 57c., the surplus of receipts having been as we have just seen 100,224 frs. 79c.; the amount of interest covered $7\frac{1}{4}$ per cent.

"In 1836 the total average of expenses having been 3,872,591 frs. 95c., and the surplus of the two 393,997 frs. 18c., the rate of interest was 10 per cent.

"In 1837 this average total rose to 12,034,282 frs. 83c., the surplus receipts having only amounted to from 226,994 frs. 12c., the interest has been only 1 4-5ths per cent.

"In 1838 the total average of expenses was 26,920,188 frs. 91c., the surplus receipts 342,777 frs.; the rate of interest was therefore $1\frac{1}{2}$ per cent.

"In 1839 the average expenses were 42,663,738 frs. 20c., the surplus of receipts 1,165,414 frs. 76c., the interest amounted to $2\frac{3}{4}$ per cent.

"To conclude, in 1840 the average expenses were 55,942,415 frs. 86c., the surplus receipts amounted to 2,338,035 frs. 66c., the rate of interest was 4 per cent.

"The rate of interest during the years 1837,

1838, and 1839, was very low, but the reason assigned in the report of the Minister respecting the receipts and expenses of those years, explain and justify these results; and we must not forget, that during a portion of those years the receipts from the railroad were confined to passengers only.

"It appears then, from the report of the Minister of Public Works, that there has been a surplus of receipts every year, that the great surplus at the commencement was afterwards diminished from causes easily to be forseen, and that the surplus is at present very satisfactory, which is in a great measure to be attributed to the carriage of goods, and it may reasonably be expected, therefore, that when the Belgian railways are in communication with the railways of France and Germany, by which means we shall have a communication with Lille, Valenciennes, Cologne, Berlin, and the whole of central Germany, the transport of merchandise will increase so much as to ensure the financial prosperity of our railway.

"Some obstacles may probably occur before this is accomplished; but perseverance is requisite, and we agree with the Minister in affirming that in whatever light we consider the superiority of railways compared with any other means of conveyance, the comparison is incontestibly in their favor. We also agree with the report in entertaining the hope that ere long subsidiary railways, connected to the principal trunk in every direction, will form a complete chain of communication, and that our country, which is so prosperous and enterprising, will form one great workshop of industry, one large family, united by general interest and co-operating for the benefit of all.

THE VIENNA AND RAAB RAILWAY.

(*From the Railway Magazine.*)

The next object of this railway, now in progress of construction, is to connect the city of Vienna with Baden and Neustadt, two important towns in the vicinity of the capital, with which it has a very great intercourse; its ultimate object is, however, of far greater importance, as it is intended to extend the railway to Raab, and finally to Buda (Ofen) in Hungary in one direction, and to Trieste in the other. Even if only one of these extensions should be carried into execution, the undertaking must be regarded as one of the most gigantic on the Continent. The distance from Vienna to Buda or Pest, in the line as surveyed in 1839, is 164 miles; while the railway from Vienna to Trieste, in its proposed direction through Styria and Carniola, will not be less than 404 miles in length.

The Vienna and Raab Railway was originally undertaken by Baron Sina; the provisory committee over which he presided made the necessary preparations; a company of stockholders was formed, and the permission for the execution of the work between Rheuna and Neustadt obtained on the 1st of March, 1839. The construction was commenced on the section between Baden and Neustadt, in the latter part of April, and between Vienna and Baden at the end of May, 1839. Up to the middle of September of that year, or during 4½ months, from 5 to 10,000 workmen were employed on the line, and the expenses amounted to £200,000. In the report made to the stockholders at their general meeting, held in October 1839, it was stated, that after the right of way had been procured, the graduation was let to 34 individuals as the lowest bidders; in the construction of the road itself, as well as of the carriages, &c. the American plan was adopted, the same having, after careful examination, been regarded by the committee as most proper. As a principle it was established, to observe a strict economy in every regard, but at the same time not to avoid any greater expense which may serve either to give the public the greatest safety and accommodation, or to preserve the company from frequent interruptions and their bad effects, occasioned by the necessary repairs of embankments and other works. A well-provided machine shop, in which the repairs of locomotives and carriages can be easily made and with little delay, being generally regarded as an essential requirement in the management of a railway, the erection of an extensive establishment, after a plan rectified by an eminent English mechanic, has been early commenced, and after several machines ordered in England for this purposo had been obtained, the superintendent of the establishment, Mr. Kraft, was again sent to England, to receive the remainder of the machines, to satisfy himself of tho good workmanship of the locomotive engines that had been ordered, and to make himself still better acquainted with the manipulation in the English machine-shops.

In the course of the year 1840, tho works on the line between Vienna and Neustadt were prosecuted with great vigor, and nearly entirely finished. At the same time extensive preparations were made for the branch roads to Presburg and to Glocknitz; the undertaking, as now in progress, consists in the following sections, viz.:—

From Vienna to Neustadt	distance	29½ miles.
— Neustadt to Glocknitz...........		16½ —
— Vienna to Presburg.............		43½ —
Total		89½ miles

The railway from Vienna to Neustadt has a double track, which was deemed necessary to accommodate the immense traffic that will crowd upon this part of the railway; the other lines will have only single tracks with turn-outs. The smallest radius of curvature adopted is 6,223 feet (6,000 Vienna feet); the maximum rise is, between

Vienna and Baden (15½ miles)..	13·2 foot per mile.	
Baden and Neustadt (14 miles)..	18·4	—
Neustadt and Glocknitz —	..37·7	—
Vienna and Presburg —	..12	—

It is further intended to continue the railway from Glocknitz to Shottwein, a distance of 5 miles, to the foot of the Semmering; here the maximum inclination will be 105·6 per mile, and the road worked by horse-power only. The railway to Raab and Buda is to commence from the Presburg branch at Potzneusiedel, 12 miles south of Presburg. Tho projected extension from Neustadt to Oedenburg, of 19 miles, will depend upon what course the Vienna and Trieste Railway will take, whether through Hungary or Styria.

The works of the Vienna and Raab Railway are conducted by Mr. M. Schoenerer as the chief engineer, who, before entering into his responsible office, has made a tour to England and the United States, to become acquainted with the extensive public works executed in both countries. Profiting both by the experience that has been had in America in the construction of railways, engines, and carriages, and of the grandeur with which similar works are executed in Great Britain, he is building his railway in a style which will make it unsurpassed by any other on the Continent, as well in regard to the construction of the road itself, as of the works of art, buildings, &c., connected with it.

The manner in which the superstructure is made on the railway from Vienna to Neustadt is briefly described in the following:—Upon the graded surface of the roadbed, which has a width of 29 feet (in excavations the width including the side ditches is 56 feet), a layer of gravel 2½ feet thick was first put, and made even and compact. Upon the latter cross ties of wood, twelve inches wide and four inches thick, were laid, at a distance of four feet from each other; they support the longitudinal sills of nine inches by four inches, and are connected with them by means of screw bolts. Iron rails weighing 53lbs per yard, of the American pattern (what they call there the H, or inverted T rail), rest upon the sills, which serve them as continuous bearings, and are fastened to the same with screws. At the joinings of two rails there are chairs of 12lbs in weight. To secure a better contact of the rail and timber, hair-felt is laid between them. The cross-ties as well as the sills are of oak. For the section from Neustadt to Glocknitz, upon which a much smaller traffic is expected, plate rails of 32lbs per yard will be employed, which are to be made fast upon the sills by means of screws.

The company have finished their large establishment at Vienna for repairing and making new engines and cars, at the enormous expense of £50,000; it is provided with the best machines, tools, and mechanics that could be procured. They are now busily engaged making a large set of locomotives and carriages after the American models.

Up to February, 1841, the amount expended by the company was already £630,000.

Of this sum there has been applied:

For the railway from Vienna to Neustadt	£500,000
For the machine shops................	50,000
For the branch railways to Presburg and Glocknitz	80,000

There will be required to finish the railway to Neustadt about £50,000 more, making the cost of the same equal to £550,000 (exclusive of the machine shop), or £18,644 per mile. This is 3¼ times as much as the cost per mile of the Vienna and Brunn Railway.

Although the section from Baden to Neustadt was already finished, in autumn 1840, the directors did not deem it proper to open the same until the other section extending from the capital will also be completed; it is expected that the whole line from Vienna to Neustadt will be opened for the public in May or June next. It is supposed that not less than a million and a half of passengers will travel annually over the railway between Vienna and Baden; the more it is to be regretted that the passenger station at Vienna is located beyond the suburbs, at a distance of two miles from the centre of the city, which will occasion comparatively a considerable loss of time.

It has been remarked, on a former occasion, that a branch railway is to lead from the "Emperor Ferdinand's Northern Road" to Presburg; a railway from Presburg to Pest, on the left bank of the Danube, as a continuation of the latter, has also been projected, and the surveys for the same are already made. It is to extend still further into the interior of Hungary, and to be called the "Central Road." It is not likely that both railways to Pest, the one on the right, the other on the left bank of the Danube, will be constructed, and there is more probability that the latter will obtain the preference.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

Trespass by the Brighton Railway Company.—The Brighton railway company have been extending their operations beyond the line authorised by Parliament. Having erected a wharf on the sea-side at Shoreham, in order to connect the railroad with the wharf they laid across the turnpike road two ridges of stone, as tramways, in opposition to the wishes of the trustees of the turnpike road, with whom they wanted to enter into an arrangement to lay rails across the road. The trustees therefore threatened to remove the ridges of stone, and restore the road to its original state. The company obtained an injunction from the Vice-Chancellor to prevent them, but the injunction was afterwards dissolved. Application was made on behalf of the company to the Lord Chancellor on Friday, but his Lordship refused to interfere. He was of opinion the company had exceeded the power given them, and though the alteration of the road was rather an improvement of it than otherwise, yet they had no right to meddle with it without the sanction of the trustees.

Annoyance from the Blackwall Railway.—In

the Court of Queen's Bench on Monday, an application was made in reference to a claim for compensation which a person who lived within fifty yards of the railway sought to establish for injuries he had sustained, first, by his business having been diminished by the removal of persons from the neighbourhood, and, in the next place, by the shaking of his house by motion of the trains. Both parties wanted the Court to give an opinion on the construction of the Act, which was refused, and a mandamus was ordered to be issued to the sheriff to summons a jury to assess the amount of damage.

Cheltenham and Great Western Union Railway.—We understand the directors of this railway made an experimental trip over that portion of the line between Cirencester and Swindon, on Tuesday, which proved highly satisfactory. The opening to the public is now fixed for Monday, 3d of May.—*Gloucester Journal.*

The Railway Commissioners appointed by the Crown to examine into the merits of the competing lines from York to Edinburgh have, it is said, reported in favor of the line by Carlisle.

Great Western Railway.—The workmen have just commenced building a splendid bridge across the open cutting of the Great Western Railway at Pound Pill in the parish of Corsham.—*Berkshire Chronicle.*

Brighton Railway.—The works of the railway terminus are going on with great expedition. Already the second permanent carriage-shed is nearly completed; and the decorative part of the grand station is in a forward state. The terminus is to be lighted with gas, and we hear that the directors also intend to light the first mile and a half of the line, as far as Preston, with gas.—*Brighton Gazette.*

Devon and Cornwall Railway.—A meeting of the committee appointed for promoting this undertaking was held at Truro on the 14th inst., at which Sir R. H. Vivian, Bart., presided. The special object of the meeting was to receive a report from Captain W. Moorsom, the engineer employed to survey the contemplated line of railway through Devon and Cornwall. The route selected by Captain Moorsom starts from Falmouth, goes near Chacewater to Truro, along the vale of Ladock to St. Austell, by Lanivet, a little to the north of Bodmin, by Blisland, within three miles of Camelford, to Alternun and Launceston, from thence along the valley of the Lyd to Lidford, and parallel with the Tavistock and Okehampton road to Okehampton, and crossing that road at Zeal takes the course of the Hollacomb and Spreyton waters into the vale of the Creedy, and passing within a mile of Crediton joins the Bristol and Exeter Railway two miles on the London side of Exeter. The Cornish line may be said to commence at Lidford, at which point a southerly line diverges to Tavistock and Plymouth. The total length of the passenger line from Falmouth to Exeter, as described in the engineer's report, is 105½ miles; and he urges the importance of keeping the cost of construction as low as possible, by the adoption of a single line of rails in the first instance, and maximum gradients of 1 in 60. For the counties through which the railway would pass, Captain Moorsom thinks both high grades and single lines, furnished with proper signals, and managed with proper skill and foresight, might be adopted with perfect safety, without involving any serious impediment to their working properties. The annual expenditure for the calculated traffic is estimated at about £91,000. The total amount which will be expended in order to open the railway to the public is £1,331,839. This sum includes works, consisting of fences, and drains, earthwork, masonry, tunnels, and permanent way, with contingencies and management on the same; and also stations, land and compensation, working stock, and parliamentary and other preliminary expenses. Out of the above sum the works would amount to £1,135,162. The portion from Lidford to Tavistock to £51,380 in addition. Under ordinary management Captain Moorsom calculates that the railway, when constructed, will produce a net revenue as high as any of the first class railways in the kingdom, the Grand Junction line, perhaps, excepted. The committee were unanimous in their opinion as to the able and clear manner in which the report was drawn up, accompanied as it was by the various plans, sections, and references, exhibiting altogether the applicability of the present locomotive power to the construction of a railway through this county. The sub-committee were requested to prepare a report for the next county meeting, to be convened as early as possible after the present parliamentary session. The meeting then adjourned.—Abridged from the *West Briton.*

The Stockport Viaduct.—The Stockport Viaduct has just been completed. The Manchester and Birmingham direct line of railway now runs *over*, not *through*, the town of Stockport. The arches literally stride over that large town. Standing in a valley in Cheshire, the town of Stockport is too low for the level of the railway. Mr. Buck, the engineer, had the first stone laid on the 9th of March, 1839, and the last or capstone, on the 21st of December, 1840. Thus in twenty-one months was completed a viaduct, based on the solid rock, of 26 arches—22 of 63 feet span, and four of 20 feet span. The length is 1,786 feet. It stands 111 feet above the Mersey, which flows beneath, and is thus five feet higher than the Menai Bridge. The foundation in the sandstone is six feet deep, and nine feet of stonework above ground. From thence to the springing of the arch the piers are of brickwork, and the huge beds of the same material: brick was used, as less likely, when well made, to chip, splinter, or decay. The quantity of brick used amounted to 11,000,000, there were also used 300,000 cubic feet of stones, and the whole cost £70,000. The utmost "settling" in the whole work, after taking the wooden supporters from the arches, is half an inch.

Opening of Taff Vale Railway.—The opening of the Taff Vale Railway from Cardiff to Merthyr was celebrated on Wednesday. The weather was beautiful, and nearly the whole population of Cardiff, with a strong muster of the fashion and beauty of the vicinity, were delighted spectators of the animating start-off. On the arrival of the first train, it seemed as if Merthyr had poured forth its whole population to receive the visitor, which makes a new epoch in its history. The day was a complete holiday; all the shops were closed, while bands of music, flags flying, and peals of cannon enlivened the day. The trains carried about 1,000 passengers on Wednesday, and the whole proceedings went off with complete success.—*Bristol Journal.*

Railways in Ireland.—It is stated in well-informed quarters in Dublin that a plan has been agreed upon for the establishment of railways in Ireland which will render any advances from the public treasury unnecessary, and that, in pursuance of this arrangement, a line of railway will shortly be commenced between Dublin and Holycross, in the county of Tipperary, to be subsequently extended farther to Limerick or Cork. English capitalists, amongst them the house of Baring and Company, are, it is stated, to advance the necessary sums, to be secured four per cent. interest by the counties through which the line extends. Any profits above that rate are to be divided equally between the capitalists and the counties. The whole system to be under the immediate direction of a government commission, and of course sanctioned by an Act of Parliament.—*Dublin Correspondent of the Chronicle.*

FOREIGN RAILWAYS.

M. Deridder, to whose talents and activity Belgium is indebted for her first railways, has just been appointed by the Duke of Saxe Coburg-Gotha, to the direction of the railroad which is to cross the Grand Duchy, where he will have the advantage of being able to make practical use of the numerous economical improvements that his long experience has suggested to him.

Paris and Rouen Railway.—We understand the bridges at Maison and Bezons, on this line of road, have been commenced under the contract of Mr. Brassy, the able and efficient contractor who so successfully executed nearly fifty miles of the London and South-western Railway. Mr. Brassy, we understand, has contracted for the first ten miles of the Paris and Rouen Railway—for all the tunnels and principal bridges.—*Morning Post.*

Railway from Brunswick to Magdeburg.—This railway it is stated will now be completed with all speed. The *Algemeine Zeitung*, in an article dated Magdeburg, April 17th, says: "This railroad will be carried direct to unite with that from Magdeburgh to Leipsic, and both companies will have but one yard and station-house at Magdeburg. The line to be chosen is not yet quite fixed, as two are proposed, and the drafts and particulars of each are sent to Berlin and Brunswick for approbation. One of the two, which is the longer, is the more convenient one for Halberstadt, and as it touches a number of Prussian towns and villiages, will probably be that insisted upon by Prussia; besides which Halberstadt would lose a great deal of its trade if any other line were chosen, and this town forms a point of communication with the Hartz Mountains, and from it a number of branch roads might be formed. The railway in this case would pass by Gross Aschersleben, whence a branch would go to Halberstadt, which is about ten miles distant, and the main line proceed to Brunswick. In my opinion, this is the preferable line, and the increased traffic will make up for the circuitous route, so that it will be possible to travel at a lower rate upon this than upon the other, which is an essential point. The second line of rails is much wanted upon the railway from Magdeburg to Leipsic, and will doubtless be laid in the course of the summer."

Railways in Switzerland.—The project for the construction of a railway between Bâle and Zurich continues to receive great encouragement. There has been already nearly paid up four per cent. on the 10,000 shares (the amount of which is equal to 5,000,000 francs); and the favorable manner in which the undertaking is considered by the generality of subscribers induces the hope that they will all fulfil their obligations with similar alacrity. The commencement of the branch between Zurich and Baden is spoken of as going to take place immediately. The zeal and activity displayed by our neighbours in the construction of railways are indeed calculated to excite a spirit of industry in Switzerland, and to induce us to bestow on the country, as soon as possible, a means of communication which is so important to trade and commerce.—*L'Helvetic.*

On the 16th of April, M. Nicolas Koechlin, accompanied by two engineers of the railway from Strasburgh to Bâle, Messrs. Chaperon and Bazaine, made a first trial on the section from Strasburgh to Benfeld. M. Sers, prefect of the Lower Rhine, the engineers of Strasburgh and Colmar, and the receiver-general of the Lower Rhine, were present at this experiment. We are informed that the result was not less satisfactory than that on the other sections of this line, which have been in full operation for the last six months. That from Kœnigshoffer to Benfeld is therefore ready to be acknowledged by the commissaries of government; and the time fixed for its being opened, the 1st of May, is no longer uncertain. We shall hope in the course of a few mouths to be able to announce the opening of the whole line from Bâle to Kœnigshoffer.—*Industriel Alsacien.*

TO CORRESPONDENTS.

If "Delta" will favour us with his name and address, the information he requires shall be forwarded to him.

MR. BAIN'S *letter shall appear in our next.*

Several books received for review shall be noticed next week.

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 23 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes, containing the Nos. of every 6 months.

THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, MAY 1, 1841.

We recently pointed out the great inconvenience to which inventors are exposed from the want of a declaration by patentees of the nature of their inventions, for owing to the want of such declaration, during the time that elapses between sealing a patent and the specification there are no means of ascertaining for what new contrivance, or for what new process, exclusive privilege has been granted. We pointed out the unfair advantages that might be taken by the unspecified patentee of this state of the law, which enables him to appropriate the inventions of others, and to prevent the real author of an ingenious contrivance from benefiting by his own ingenuity. We see no reason that should induce an honest inventor to object to describe in writing, to be kept sealed by the proper legal officer, a description of the principle of those improvements for which he claims to be privileged. The particular mode of constructing the apparatus need not be stated, but such description of its general features might be given as to explain the nature of its action, and to enable the parties authorised to examine the description, when application is made for patents for similar inventions, to determine whether the two inventions are alike. Some arrangement of this kind would be a necessary preliminary to another practical improvement in the patent laws, for which most patentees are anxious; viz., an extension of the time for enrolling their specifications.

In the present state of the patent laws, an inventor dare not, in most cases, perform the necessary experiments for verifying the applicability of his invention, lest the nature of it should be divulged, and his claims be thus invalidated or fraudulently appropriated. Tho inventor is thus frequently obliged to obtain his patent with only an imperfect knowledge of the effects to be produced by his invention; and often, indeed, without having submitted it to the test of any conclusive experiment. The space of six months from the time the patent is sealed until it must be enrolled and the mode of operation made public, is in many cases much too short to enable the inventor of any important machinery, especially if it comprise an entirely new application of a principle, to ascertain the best mode of carrying his invention into operation, and to put his claims and description in such forms as are best calculated to protect him from the subtleties of the law.

At present no distinction is made between inventions of minor and of greater importance; though it is self-evident that the time required to make the experiments and prepare the specifications must in one case far exceed the time required in the other. We say nothing of other distinctions that reason and common sense suggest ought to be made in the grants of patents of different degrees of importance and utility; we now wish to confine our remarks to those amendments which might be readily introduced in the patent laws without prejudice to existing interests, or without effecting greater changes than would be generally agreed to. We suggest, therefore, in reference to specifications, that in the first place there should be a preliminary declaration delivered on the first application for a patent, which should state the nature of the invention in general terms, yet sufficiently definite to indicate its peculiar claims to protection.

Were a sealed declaration of this kind entered, only to be opened by an authorised officer in case of application for competing inventions, the objection that might otherwise be urged against a prolongation of the time for entering specifications would be removed. This extension of time would not be generally required; and in order to prevent unnecessary delay, it might be requisite to attach an additional fee in those cases where it was demanded. The latter part of our suggestion, we have no doubt, would meet with little objection in official quarters; and as the extra charge would be attended with extra accommodation, we believe that patentees would, in most cases, gladly avail themselves, for a small additional fee, of the opportunity which the extension of time would afford for their experiments and the arrangement of their claims.

It would be advisable to vary the period of extension, within certain limits, according to the importance of the invention, or the difficulty of bringing it to perfection. Eight, ten, even twelve months, might, in some instances, be advantageously granted to a patentee before he is required to state in detail the manner in which the apparatus he has invented can be best constructed to produce the desired effects. No inconvenience to other inventors would arise from this increased extension of the period of specifying, at all equal to the present uncertainty in which they are compelled to remain for six months; for at any period an application to the proper officer, with a description of their own inventions, would remove any doubt respecting the similarity of their general applications.

Modifications in the patent laws such as we now recommend might be effected without, as we conceive, meeting opposition in any quarter. It is true they would be only partial amendments of a system that is radically bad, but in the absence of all chance of effectual reform it would be satisfactory to obtain even these ameliorations.

EXPLOSIONS IN COAL MINES.

Were an equal number of lives to be lost in any branch of manufacture above ground that is now sacrificed annually in working the coal mines of this country, the subject would excite general interest, parliamentary inquiries would be instituted, and laws would be passed for enforcing regulations calculated to check the fatal calamities. As it is, we hear

from week to week of explosions in coal mines, by some of which three, seven, eighteen—and last week thirty—lives are lost by one explosion, and after a passing expression of lamentation they are little more thought of. The accidents happen underground, where our selfish sympathies do not reach, as we are not likely to be placed in danger of such disasters ourselves, therefore the poor pitmen are passively allowed to be blown to pieces or suffocated in their subterranean galleries.

The accident last week at Willington colliery shows clearly enough, if any such evidence were wanted, that no coal pit can be considered safe from one minute to another. The ventilation is liable to be impeded by accident, or the sudden rush of gas from the chasms in the rock may at any time raise the air to the explosive point, before sufficient warning can be given. Under these circumstances it ought to be made imperative on the owners of mines to provide their men with a sufficient supply of the best constructed safety-lamps, and to adopt means for keeping them properly trimmed and in good condition; whilst on the part of the men, it ought to be a severely punishable offence if they ever expose a naked flame in the atmosphere of their galleries. The inconvenience attending the use of the Davy lamp is, that the wire gauze obstructs the light, and the men are therefore always ready to employ candles whenever they consider the mines safe. This ought not to be permitted under any circumstances. The reckless disregard of their own and of their fellow workmen's lives, shows that the ordinary considerations of personal safety which actuate most men, are not sufficient to induce the miners to adopt the necessary precaution. The obligation should be compulsory; and each instance of neglect, whether attended with accident or not, ought to be strictly punished.

The Davy safety-lamp, which, if properly and constantly used, affords assurance of safety, has been hitherto an implement of destruction. Dangerous workings that would otherwise have been abandoned, have been explored by its safety-promising flame, and then in moments of carelessness, the explosive atmosphere has been ignited, and lives sacrificed. Unless the constant use of the safety-lamp be enforced, it would be almost preferable to dispense with it altogether.

NEW INVENTIONS.

A RAILWAY TRAIN CONTROLLER.

A private exhibition of a model of Mr. Hancock's ingenious contrivance, for enabling persons on a line of railway to stop a train in case of danger, took place on Saturday at the Zinc Works in Parliament-street. This invention, which is very properly called a "railway train controller," affords an instance of the advances made in bringing those apparently uncontrollable moving masses under the guidance of man. By this apparatus a child on the railroad might be able to stop the swiftest and heaviest train. The principle on which the contrivance depends has been partly applied for other purposes in railway locomotives; it consists in connecting a part of the machinery with a vertical arm or shaft to which a projecting rod placed at a small distance from the rails is attached. This rod is to be acted on by a projection on the rail, so that when the engine arrives at that point the projecting arms strike against each other, and thus move the shaft attached to the machinery of the engine. In Mr. Hancock's patent apparatus three important effects are produced by this single action; the steam is turned off, the breaks are put down, and the steam-whistle is sounded. It is proposed that, at numerous points on the line, the apparatus shall be fixed to the roadway for acting against the projecting lever, so that the policemen can at any time stop a train if they are aware of danger a-head. The additional apparatus to the engine is so contrived that it does not interfere with the ordinary working of the machinery.

MR. CURZON'S IMPROVEMENTS IN THE STEAM-ENGINE.

Certain improvements in the construction of steam-engines have lately been patented by Mr. Henry Curzon of Kidderminster, adapted more particularly to facilitate the working of steam expansively. The disadvantage which in many cases attends the working of steam expansively is, that the motion is not uniform. To remedy this inconvenience Mr. Curzon combines three or more steam cylinders to the working of one common shaft, so that in each cylinder the steam may be used expansively through the greater part of the stroke, and the full pressure of the steam in one or other of the cylinders is constantly exerted on the crank shaft. The following is the patentee's description of the action of the engine when three cylinders are employed:—"If the steam engine is to consist of three steam cylinders, then they being each connected by ordinary well-known means to the shaft or axis to which they are jointly to communicate motion, and in such manner that one piston precedes the next by a distance equal to one third of the length of the stroke, the cylinders being all of the same diameter and length of stroke, and the slides or valves of each cylinder are to be so arranged as to cut off the steam at one third of the stroke, as is well understood; hence, by this arrangement the steam in each cylinder will be worked expansively two thirds of the stroke, and owing to the mode of combining the three cylinders, there will, at all times, be one or other of the pistons working by the pressure of the steam through the first third of the length of the cylinder; another cylinder will be working with the steam expanding through the second third of the length of stroke; and another cylinder will be working with the steam expanding through the third of the length of stroke; and it will readily be seen that, supposing the pressure on the whole area of the pistons to be taken at different points of the rotation of the shaft or axis to which the three steam cylinders are communicating motion, much greater uniformity of power will be found to prevail at all points of motion than could heretofore be obtained when working steam expansively." Though the patentee considers it advisable, if great uniformity of motion be required, that as many cylinders should be employed as the spaces into which the original quantity of steam is allowed to expand, yet the uniformity of motion would not be prejudicially altered, when four cylinders are employed, were the steam to be cut off at one sixth of the stroke, or even less. He prefers steam at a pressure of 15 lbs. to the square inch.

NEW MODE OF PROPELLING SHIPS.

L'Emancipation, Brussels paper, of the 19th April, contains the following notice of a mode of propelling ships, which it represents to be entirely new, and likely to prove of great utility:—

"Some time since we announced from a letter we received from Cologne, that a discovery had been made there of the greatest importance, and which might be the means of effecting a revolution in navigation. We have to-day received another letter relative to that invention, which consists, as we have said, in propelling boats without the use either of paddles, sails, &c., and by a method unknown till the present time. Messrs. Beyse, an engineer, and De Garthe, professor, at Cologne, inventors of this method, have obtained a patent for ten years, and they have already secured, or will secure, the exclusive right to their invention in France, Holland, and other countries. It is said that navigation will derive great advantages from adopting this new plan, for the length of time occupied in voyages will be considerably less, and great swiftness will be attained with less expense. Many navigation companies having already applied to M. Beyse and Garthe for permission to use the invention, we shall soon have it introduced on our seas, rivers, and canals."

SCIENTIFIC CORRESPONDENCE.

CORNISH PUMPING ENGINES.

To the Editor of the "Inventors' Advocate."

SIR,—There is one force contributing, I think, very materially to account for the work done by the Cornish engines, which I am strongly impressed with the conviction, when enumerated at all among the data produced to exemplify the power of those and other pumping engines (especially when working expansively) is not insisted upon as an item of the importance it really merits; and which, when entirely left out of the question, I am convinced every theory, however ingenious, must appear not completely satisfactory —in fact, must still leave the calculating mind in the uneasy predicament of remaining unconvinced, and in doubt. Allow me to offer this force, or rather, perhaps, I should say, application of force, for your consideration, and that of your many readers, who will feel interested in the several articles which have recently appeared in the *Inventors' Advocate*, on the impulsive—rather than percussive—power of steam.

Water, to be lifted, may be considered practically a solid, inexpansive, and truly a *dead* load; it is represented best in its properties by molten metal; it is in load a metal; in apathetic inertia a fluid. Such a heavy, dead, inert thing will require an *immense heave* at first, when power is advantageously brought to act upon it, to get it well in motion; but that point attained, the momentum which this heave has thrown into the ponderous load will cause it, with the aid merely of much reduced steam power, to rise many feet; its advance, of course, being gradually slower as its momentum exhausts itself, and as the assisting steam gradually becomes more rarified, till at the turn of the stroke there is no material *shock* left in the water which is rising to counteract the natural movement of the engines. I hardly need add, that the more effectual the first great heave of the steam (and most effectual it appears to be in many of the Cornish engines) the less power comparatively afterwards will be required to complete the stroke.

When the pumps draw out of wells containing a considerable depth of water, or from other large reservoirs, the momentum I have been insisting on I think will be found to be much increased in the upstroke, whether buckets or plungers are used in the pumps. This will arise from the *firm*, ponderous column (as I must be allowed so to express it, to convey the difference of idea I wish between it and a springy *unmassive* column of air) of dense water *following* the bucket or plunger. The momentum which such column will acquire will be that which, in due proportion with the steam power above it, can be thrown into it by one atmosphere of the same area, acting on the head of it from the top of the well or reservoir; and which atmosphere will also determine the length or height of the column following with strong impulse the pump-buckets. I have here considered the momentum of the column of water only following the bucket or plunger, without taking into account (as I believe it is unscientific to do so) that of the water on all sides of it, also put in motion, and *perhaps* pressing upon it in some

degree, laterally, to supply the place of this column then slipping away. You will, I think, perceive, Mr. Editor, that the atmosphere pressing against the water rising above the bucket in the pump will not invalidate the *momentum*, which, when once in motion, is due either to itself or to that of the after column following the bucket.

If you give this letter a place in your very interesting paper, that its merits, if it possess any, may be duly canvassed, it will oblige,

Yours truly,

Sheffield, April 27, 1841. J. G. S.

ON CRANK ACTION.

To the Editor of the "Inventors' Advocate."

Sir,—The drift of my questions relative to "crank action" is simply this, that I wish to ascertain whether you *theoretically* admit or dispute the possibility of transmitting the whole of the power applied to the piston to the crank shaft, deducting friction, &c.; and for this reason, that in discussions of this nature it is necessary we should start from some point upon which we are mutually agreed, for if you dispute the possibility, it becomes necessary that the amount of such loss be first correctly estimated, as it will more or less affect the results of the subsequent stages. It is like mathematical data; except such data be correct, the whole of the calculations founded upon them are useless.

I must, therefore, beg leave to differ from you in your remarks; for the question to be *first* determined "*is*, whether by any possible arrangement the crank (or rather the mode of communicating power to the crank) can be so improved as to act without loss of power;" for on this question depends the amount of loss by the present arrangement. If this question can be proved, we know our limits of approximation. As to the *present arrangement*, it varies in some particular with almost every engine, to suit either taste or convenience, and consequently one particular engine must be named, or some particular arrangement defined, upon which to direct the inquiry. I am, sir, your obedient servant,

Norwich, April 27, 1841. F. Ham.

[Mr. Ham's letter indicates a controversial spirit, opposed to his previously-announced declaration, that "truth and not victory" was his object. He appears to wish to entrap us into a declaration of opinions, with a view to use them as his weapons against ourselves. The question of loss of power by crank action may surely be stated without reference to our opinion on a point which has not been mooted in any article we have yet written. As Mr. Ham seems determined to proceed in due logical form, we ought, perhaps, cautiously to abstain from any admissions; but we are willing to state, that "as at present advised," our opinion is that the communication of motion by the crank must be attended with great loss of power, even could the connecting rod be made to act constantly parallel to the piston rod. We are the less disposed to withhold this opinion now, as it might be inferred from our former articles.]

Occasional Steam Propellers.—The *Maria*, Captain Longsdale, which has been fitted with a 20-horse engine, and a pair of Mr. Melville's patent propellers, to be used as an auxiliary in calm weather, left the West India Docks last week for Calcutta. The success of this experiment is looked forward to with much interest, as it will determine how far this kind of auxiliary power will shorten the time usually required for the voyage to India. The engine, a high pressure one, of extremely simple construction, has been made by Mr. Beale, of East Greenwich. The paddles are similar to those of the small experimental boat, the *Propeller*, which has for several months been conveying passengers between Blackwall and Greenwich. The whole of the external machinery can be unshipped in an exceedingly short space of time, and can be stowed away in any part of the vessel. There are no paddle-boxes or paddle-wheels, and the propelling apparatus can scarcely be discovered, even when in operation, except by the escape of the uncondensed steam. There is no smoke from the funnel, owing to the plan which is adopted of using rotary fans for conveying air to the furnace. A large party of scientific and nautical gentlemen proceeded down the river in the vessel, many of whom went with her as far as Gravesend.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(Contributed expressly to the Inventors' Advocate.)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING MAY 3rd, 1841.

Monday	Entomological Society	8	P.M.
	British Architects (Anniv.)	3	P.M.
	United Service Institution	9	P.M.
Tuesday	Linnæan Society	8	P.M.
	Horticultural Society	3	P.M.
	Civil Engineers	8	P.M.
	Architectural Society	8	P.M.
	Uranian Society	8	P.M.
Wednesday	Society of Arts	7½	P.M.
Thursday	Geological Society	8½	P.M.
	Zoological Society	3	P.M.
	Royal Society	8½	P.M.
	Antiquaries Society	8	P.M.
Friday	Royal Institution	8½	P.M.
	Botanical Society	8	P.M.
Saturday	Asiatic Society (Anniv.)	1	P.M.
	Mathematical Society	8	P.M.

ROYAL INSTITUTION.

April 23. Friday Evening Meeting.

Mr. Macilwain delivered a lecture "On Payne's Invention for Resisting Decomposition, applied to the Preservation and Economy of Provisions." He prefaced his remarks on the process, by detailing some interesting physiological facts connected with the nutrition and assimilation of animals and vegetables, and dwelt more particularly on the means nature employs to ensure the continuation of the species on the earth, so that a supply may always be found adequate to the demand. In the animal kingdom, especially, such provision is manifest, as will be at once evident by the inspection of the following table, showing the quantity of ova (eggs) found in the ordinary fish, made use of as articles of diet.

	Ova.
Carp	101·200
Cod fish	5·686·760
Flounder	132·607
Herring	32·685
Lobster	7·227
Mackerel	454·961
Perch	28·323
Prawn	3·806
Roach	81·506
Shrimp	3·057
Smelt	29·925
Sole	109·362
Tench	280·087

In illustration of the same principle in the vegetable kingdom, it was stated, that,—

An oat stalk yielded 257 grains or seeds.

One pea produced 88 pods, containing in all 386 peas.

One scarlet runner has produced 500 beans.

One elm produced 1,594·000·000 seeds.

A single spatha of the date palm yields 12,000 male flowers.

He then considered the consumption of meat in the larger towns, as London, Manchester, Liverpool, Leeds, Shields, Glasgow, &c., and stated that according to the returns made to Parliament the following account would give but a very imperfect idea of the quantity of fish cured in Great Britain during the year; and this he brought forward to show, that as so large a consumption of fish is required, he could only imagine that the great obstacle to the preservation of flesh is dependent on there not having hitherto been introduced a means of effectually and expeditiously curing it. The quantity of fish cured in Great Britain annually amounts to—

Of Cod	95,395	cwt.
Ling, Hake	6,053	barrels.
Herrings	500,000	,,
Pilchards	30,000	hogsheads.

Tables were alluded to, exhibiting the annual exports of animal provisions from Boston, U. S., Buenos Ayres, Copenhagen, New York, &c.

The increasing state of the population, and the expensive state of provisions, are sufficient proof, in Mr. M.'s opinion, that some means should be devised to prevent as much as possible the decay (during the warm weather especially) of those articles ordinarily used as food; and this machine of Mr. Payne's was considered of paramount importance to effect this object. Atmospheric air was stated as the great agent in producing decomposition. The constitution of the atmosphere was described, and its constituents considered seriatim as to their power of effecting decomposition. Air is a mechanical mixture, and made up of the following elements:—

Nitrogen—this gas taken alone does not seem to favor decomposition.

Oxygen is a great favorer of decomposition.

Carbonic acid cannot be considered to facilitate decomposition.

Water, in a state of vapor more particularly, is a great agent in producing decomposition.

Caloric and *light* are likewise powerful agents in decomposition.

Electricity.

Mr. Macilwain alluded to both the mechanical and chemical considerations of the atmosphere, and stated that both were taken advantage of in Mr. Payne's process.

The means generally used to preserve animal matter from decomposition are, either to exclude air altogether from the substance, or to immerse it in either vinegar, sugar, alcohol, and the metallic oxides in solution. Desiccation is very extensively employed in some parts of the world for preserving food. The arteries are also frequently injected with saline solutions for the same purpose; but the most common antiseptic of all is salt dissolved in water; those above mentioned are not so generally in use, on account of their being either too expensive, or insecure in their action. Mr. Macilwain is of opinion with others, that salt undergoes a change on exposure for a time to the atmosphere, which materially interferes with its properties as an antiseptic; it is found to lose its flavor. One of the greatest drawbacks to the introduction of salt for curing provisions is, that in the warmer latitudes it is difficult to make it *strike* into the meat, and is consequently in those regions very insecure in its operation; independent of this, it is found that much labor is required in the process; and the most important of all appears to be, that it abstracts from the meat much of the nutritious particles. In London the loss of meat in the warm weather is enormous. In fact, it was stated, on the authority of Mr. Giblett, a large dealer of provisions in Bond-street, that the meat lost in the metropolis during the summer was considered to be sufficient to supply the whole of the destitute in the United Kingdom.

The object Mr. Payne has in view is to apply the salt thoroughly and perfectly to the meat, and this he accomplishes by the assistance of atmospheric pressure, hydraulic pressure, and lastly he makes the meat act as a filter through which the brine passes. To give some idea of the effectual manner in which the machine acts, and at the same time to explain how every part of the tissue becomes impregnated with the solution, Mr. P. instituted some experiments, two of which we here quote:—1. He took a common bone, and some brine colored with a solution of indigo; by means of the apparatus presently to be described, he injected the entire substance of the bone, and which, when cut through, exhibited a blue appearance throughout the structure. 2. In this experiment he removed the marrow from the cavity of a bone, and filled it with fresh meat; the ends were hermetically sealed, and the solution of brine was forced through the bone, and effectually salted the flesh in the interior.

The apparatus may be thus described:—An iron cylinder is employed, having a cover which is firmly fixed down by clamps; to this an air-pump and hydraulic pump are connected; at the bottom of the cylinder is a tube with a stop-cock, the extremity of which dips into a pan of brine beneath. The fresh meat is placed in the cylinder, and the lid fixed down; the air is then exhausted from the cylinder, and consequently the meat; as soon as the

air is sufficiently withdrawn, the stop-cock is turned, and the brine rushes into the vessel, to supply the void space, and most effectually penetrates the meat. When this is done the pressure is increased by means of the hydraulic pump to about 7 or 8 atmospheres. He allows it to remain for a minute or two, and by another contrivance causes all the brine to filter through the meat back into the brine tub beneath.

The lecture announced for next Friday was, Mr. Cowper on the recent Improvements in Chronometers and Astronomical Clocks.

NUMISMATIC SOCIETY.

April 22. *Professor Wilson, F.S.A., &c., in the Chair.*

Mr. Charles Roach Smith, F.S.A., read a paper "On Roman Coins found in the bed of the river Thames," especially as illustrative of the early history of London. During the operations which have for some years been going on in the site of the old bridge, several large, second, and small brass, with a few silver, and three gold medallions were found, two of which were discovered beneath the piles of the old bridge; they were principally of Domitian, Vespatian, Titus, Adrian, Diocletian, Severus, Constantinus, Claudius, Nero, &c., forming a history of the Roman dynasty in Britain for the space of three years and a half. They were in a good state of preservation. It is supposed by some that they must have found their way into the river when an old curiosity shop was burned which had its site on the old bridge; others imagined that they had been by accident lost at the ferry, formerly existing at this spot. The writer, however, gave it as his opinion, that there formerly existed over the river at this spot (a line parallel from the City to the Southwark side) a bridge built by the Romans. It is well known that these people were desirous of carrying their deeds of fame down to posterity, and no testimony was so much appreciated for this purpose as numismatic records to commemorate their several epochs. Some of these coins, he contended, might have been deposited at the foundation of the bridge, some at its successive repairs, and others thrown into the river on different events occurring which were deemed worthy of future record. It was also stated as singular that none of these coins were worn further than what would be occasioned by the triturature of the gravel, and amongst them were found no British, Greek, or Saxon coins, except deposited by obvious accident. Near the foundation of the old bridge was also found a colossal head of Adrian, with many beautiful bronzes, which it was evident had been defaced and destroyed by the early Christians in their zeal for the destruction of every symbol of idolatry; and it was not improbable but in their hands coins might share the same fate. Several masses of coins were likewise found in a semi-fused state. The paper created much interest, and was discussed at length.

MICROSCOPICAL SOCIETY.

April 28. *Professor Owen, F.R.S., &c., President in the Chair.*

Dr. Lee, Mr. Wheeler, and Mr. H. H. White were elected members. Dr. Arthur Farre, the secretary, read an interesting paper "On the Minute Anatomy of the Larva of *Anthomyia caniculata* of Meyeo." This parasite is occasionally found in the cœcum of the human subject, although by no means general, two or three cases only being on record. Among animals it has its analogue in the bott of the horse and sheep; this species has, however, been found by Mr. Iliff in the excrement of the Boa constrictor, mingled with the urate of lime. The individual which afforded the specimens which Dr. Farre examined and described in detail, was a girl of 11 years old, a patient in St. Bartholomew's Hospital. She was of a sickly appearance, and suffered from the ordinary intestinal irritation produced by worms, which were passed alive on the administration of a brisk purge. A case of a clergyman was mentioned who in the course of a short period evacuated several quarts of them. Dr. Bateman also details a case of their occurrence.

Dr. Farre then described its anatomy and structure. The larva is about half an inch long and one-eighth of an inch broad, of a dark brown color. The body is composed of eleven segments, and the last is formed of three blended into one. The integument on examination was found to be granulated. The mouth is composed of two broad fleshy lips, with a minute apeiture in the centre between them which leads to the œsophagus; each lip is crossed by 25 lamellæ or plates, notched on their margin. This arrangement enables the worm to attach itself firmly to the interior of the mucous membrane. The mandibles are hook-shaped, sharp, and divided into three portions: the first is hooked and sharp; the second has a ball at the end, fitting into the third, which has a socket, and is formed of an expanded corneous plate, in which the abductor and adductor muscles moving the first and second portions are inserted. The length of the entire mandible is the sixteenth of an inch; that of the first joint only one-sixtieth of an inch. The alimentary canal was described as being long and convoluted, temioating at the third segment of the body of the parasite; its length is about six times that of the body. Its whole structure seems to indicate that it is intended to live on fluid matter. There are only two external openings of the tracheæ.

The most interesting point connected with this entozoon is, that at the time when Dr. Farre was examining those obtained from the body of the child, he detected three others of the same species, in a living state, from the water of the New River; this point was considered of paramount importance by the gentlemen who entered into the discussion, as proving the source of these creatures, and not, as has been hitherto supposed, that they were generated spontaneously in the human body.

Mr. Owen was of opinion that the paper was of the greatest importance, especially as Dr. Farre had clearly ascertained the identity of the species as occurring in the New River and those from the cœcum of the girl. It was interesting, as it threw great light on the manner in which these worms get into the system, a subject hitherto in complete obscurity. Ray, Rudolphi, Bremser, and others, who have written on the subject, being of opinion that they were generated by equivocal or spontaneous means. He rejoiced to find that a new light had been thrown on the subject by the researches of Dr. Farre, which at once repudiates the existence of spontaneous generation, this theory having been the means of retarding science to a very great degree. When speaking of this subject he made a few observations on the geographical distribution of parasite worms in the human body, and stated that the English, French, and Germans, and some few others, had one species in common, while the Swiss, the Russians, and others were infested by a much larger parasite, altogether different both as to its form and size.

Mr. Bowerbank, in endeavoring to explain how the eggs of these larvæ found their way into the body, alluded to a variety of interesting facts connected with the mode by which they are taken into the body of the horse, &c.

Mr. Bowerbank also made some verbal observations "On the Generation of Sponges," detailing some new facts he had recently discovered, in examining the structure of agates. He had found the ova or gemmules in almost every stage of development in the agates, which are of fossil origin, as is well known; and while the whole of the sponge had become removed by decomposition, the ova still remained in a perfect state. He has also observed ovaries imbedded in the fibre of fossil sponges, and states that in the interior of the fibres he has detected tubes, of a simple natuie, and within which are incipient gemmules, having the appearance of minute globular bodies, enclosed in ovarian tubes.

Mr. Jackson laid before the meeting a portable candle or lamp for microscopists, which burns the candle without wicks, manufactered by Molyneux. The society then resolved into the conversazione and examination of objects.

CHEMICAL SOCIETY.

April 27. *Professor Graham, F.R.S., &c., President, in the Chair.*

The preliminary business having been completed, the Secretary proceeded to read a letter addressed to him from Mr. Scanlan, "On Flashes of Light given off during the Crystallisation of Nitrate of Strontian." This fact was observed for two hours. A paper was read from Mr. Tilley, "On the Action of Nitric Acid on Castor Oil," producing Œnanthic acids, ethers, and their salts. A communication was also read from Mr. Detmer, "On the Bleaching Salts of Chlorine," and one also from Professor Graham, "On the Manufacture of Chlorate of Potass." The Chairman read an abstract of a letter from Mr. Simms, "On the Occurrence of the Phosphate of Yttria in the Cobalt Ore of Johannisberg," which is produced by acting on it with acids, when the preparation just referred to remains; a fact of some considerable importance, as its presence has not hitherto been detected in that situation.

INSTITUTION OF CIVIL ENGINEERS.

The annual report of the Council of the Institution of Civil Engineers, has just been published. The report is too long to give entire, but the following extracts from it comprise all that is generally interesting. It will be perceived that a great portion of the document is occupied with complimentary notices of the papers by Mr. Parkes, to whom the Telford medal has been awarded. The Council, in referring to the opinions of that gentleman on the percussive action of steam, seem to countenance the notion of such an extra power. It becomes the more necessary, therefore, that the question should be set at rest, for the more we consider the subject, the more erroneous does such an opinion appear.

"In the annual report of the last session the council stated that it would be one of the earliest duties of their successors to consider in what manner the benefits conferred by your member, Mr. Parkes, on practical science, by the communications then alluded to, could be most appropriately acknowledged; and the present council, concurring most fully in these sentiments, are of opinion, that as no papers have hitherto been received by the institution exhibiting so much originality, labor, and ingenuity, in dealing with the facts presented to his notice, combined so essentially with practical utility, they are warranted in conferring on Mr. Parkes the highest honor which the institution has in its power to bestow. They have awarded, therefore, the Telford gold medal to Mr. Parkes, for his communications on "Steam Boilers and Steam-Engines," which are now published in the first and second parts of the third volume of the "Transactions."

"These communications are the continuation of the labors of the author, which commenced with the paper on the 'Evaporation of Steam Boilers,' published in the second volume of the 'Transactions,' and for which a silver medal was awarded on a previous occasion. The first communication, forming the subject of the present notice, relates especially to steam-boilers, respecting which many well-ascertained facts had been collected; but previously to Mr. Parkes devoting his attention to this subject, no clear and connected view had been given of the various facts, or of their relation to each other, and to the circumstances under which they are exhibited. When so represented, it appears that the peculiar circumstances under which steam-boilers are employed, and their corresponding qualities and characteristics in respect

of construction, proportion of parts, and practical management, present certain quantities and relations, which exert a peculiar influence over the results connected with evaporation; and these being clearly developed and understood, indicate correctly the character of the boiler. Certain definite quantities, relations, or exponents, with other facts of paramount importance, such as the effect of the element time, or the period of the detention of the heat about the boiler, and various actions independent of the temperature of the fire, and tending to the destruction of the boiler, are here for the first time pressed on the attention of the practical engineer. In the second communication the author traces the distribution and application of steam in several classes of steam-engines. In the execution of this task, he is led into a detailed examination of various important questions; the best practical measure of the dynamic efficiency of steam, the methods employed to determine the power of engines, the measures of effect, the expenditure of power, the proportions of boilers to engines, the standard measure of duty, the constituent heat of steam, the locomotive engine, the blast and the resistance occasioned by it, the momentum of the engine and train as exhibiting the whole useful effort exerted by the steam, and the relative expenditure of power for a given effect by fixed and locomotive non-condensing engines. The bare enumeration of the principal subjects, which have been carefully analysed and illustrated by the facts applicable to each respective case, will give some idea of the magnitude of the task here undertaken; and when in addition is considered the elaborate and extensive series of tables exhibiting the results and analysis of the facts collected and used in the course of the inquiry, the council cannot but feel that a more laborious task has rarely been accomplished. A peculiar feature of these communications, and one to which the council would particularly advert, is, that they are not of a speculative character, but present a detailed analysis of authenticated facts.

"This analysis consists in separating and ascertaining the various results, and in referring them to particular classes, so that they may be readily applicable in practice. The merit of instituting and recording a series of observations upon a scientific subject is universally acknowledged, but the reduction of such observations so as to form a standard of reference to which the practical engineer may appeal, is a task of far greater difficulty, and its execution of far higher merit. It is in this eminent rank that the council would place these communications of Mr. Parkes."

"A silver medal and the life and works of Telford have been awarded to your associate, Robert Mallet, for his communication on the 'Corrosion of Cast and Wrought Iron in Water.' This communication presents features of no ordinary interest to the engineer. The comparatively recent introduction of cast iron for the purposes of piling, for wharfs, &c., and of wrought iron in the construction of vessels, has rendered the subject of the action of water upon iron of peculiar importance; the British Association have from time to time granted sums of money for making experiments on this subject, and Mr. Mallet having been engaged in conducting these experiments, has selected from the very extensive series of results obtained by him those conclusions which may be of service to the practical engineer. The most valuable portion of this communication consists of elaborate tables; which exhibit the results of the action of clear and foul sea and fresh water at different temperatures upon cast and wrought iron. Such being the general nature of the experiments, the results to which they lead, or the effects produced, present several remarkable characteristics, and it is found that the corrosive action of water and air combined produces on the surface of cast or wrought iron a state of rust possessing one of five distinctive features, viz.: uniform, uniform with plumbago, local, local pitted, tubercular, or some two or more of these in partial combination. The practical results which may be deduced from these tables are of the highest value to the engineer, and point to considerations of the greatest importance; thus the upper and lower strata of water, of different degrees of saltness and density, coming in contact with the same mass of iron, a voltaic pile of one solid and two fluid elements is formed, and under such circumstances the corrosive action is materially augmented; hence it follows as a practical conclusion, that the lower part of all castings used in such situations should be of increased dimensions. Similar results, the knowledge of which is of great importance to the practical engineer, such as the rapid decay of iron in the sewerage of large cities, of the bolts of marine engines exposed to the bilge water, and of boilers containing hot sea water, are referred to actions due to similar physical principles. The protection which metals receive from paint, or from the presence of various alloys, so as to obtain a mode of electro-chemical protection such that, while the metal iron shall be preserved, the protector shall not be acted upon, is also referred to similar principles.

"The council have also awarded a bronze medal and books to Mr. Charles Bourns, for his communication 'On setting out Railway Curves;' to Mr. Chapman, for his 'Description and Drawings of a Machine for describing the Profile of a Road;' and to Mr. Henry Renton, for his 'Description and Drawing of a self-acting Waste-board on the river Ouse.'

"The communication by Mr. Bourns is an application of simple geometry, leading to practical results. In setting out curves recourse has been had to various expedients; but Mr. Bourns, in the propositions contained in this paper, has shown that, by the use of the common chain, an offset staff, and table of offsets, he is enabled to set out curves of any radius and flexure, with a facility and precision not generally attained.

"The description and drawings of a machine for describing the profile of a road is one of several communications on this subject, sent in accordance with the notice of subjects for competition issued by the council. Many of the arrangements proposed by the author exhibit considerable ingenuity; and, though difficulties may exist in their practical application, the council think this attempt may be of assistance to others who may have their attention directed to the construction of an instrument for similar purposes.

"The description and drawing of the self-acting waste-board on the river Ouse, being an account of an executed work, is one of those communications which the council are most anxious to encourage by every means in their power. The drawing and description furnished by Mr. Renton are highly creditable to the talents of the author, and deserving of some special mark of approbation.

"The council have also awarded books to the value of five guineas to Eugenius Birch, for his "Drawing and Description of the Machine for Sewing Flat Ropes, in use at Huddart's Rope Manufactory."

"Premiums of books have also been awarded to Mr. Maude, for his 'Account of the Repairs and Alterations made in the construction of the Menai Bridge, rendered necessary by the gale of January 7, 1839;' and to Mr. Andrew Burn, for his 'Drawings of a Proposed Suspension Bridge over the Haslar Lake.'"

"The institution has received during the past year many other communications of acknowledged merit, of which no mention has yet been made. To a few of them the council would now briefly advert, and especially to the last paper by Mr. Parkes, 'On the Action of Steam in the Cornish Single Pumping Engine'—a communication of no ordinary importance and interest, either on account of its own intrinsic merits, as viewed in connection with the past proceedings of this institution, or the future prospects of this department of practical science. This communication, though intimately connected with those of the same author previously alluded to, growing immediately out of them and depending upon the facts contained in them, is of a totally distinct character; being an attempt to explain, on theoretical principles, the action of the steam on the piston, and to unfold the real causes of the economy of the Cornish engines. This subject has occupied the attention of the institution during the last four years; and the discussion first assumed a settled form during the session of 1837, on the receipt of the communication of Mr. George Holworthy Palmer, 'On the Application of Steam as a Moving Power, especially with reference to the reported duties of the Cornish and other Engines.' In that paper the author, reasoning on certain data as to evaporation, and on the physical facts which involved the constancy of the sum of the latent and sensible heat in steam of all elasticities, and of the absorption of heat by matter on dilatation, came to the conclusion that no power could be gained by expansive working, and that, consequently, this could not be the *cause* of the economy in Cornish engines. This discussion was revived in the ensuing session by the communications of Mr. Wicksteed and Mr. Henwood—the former furnishing the first recorded experiment in which the water raised was actually weighed; the latter giving an extended series of most careful and detailed observations on the quantity of steam employed, the mode of its distribution, the duty performed by a given quantity of fuel, and the measurement of the water raised.

"Taking for data the facts furnished by Mr. Henwood for the Wheal Towan, and by Mr. West for the Fowey Consols engines, Mr. Parkes has analysed the quantity of action obtainable from the quantity of water as steam consumed, and expanded to the extent used in those engines, and has found the steam's force unequal to the resistance overcome. After satisfying himself, from various phenomena attendant on the working of these engines, that the amount of resistance opposed to the steam was not over-rated, he was led to conclude that from the instantaneous and free communication effected between the cylinder and boiler of these engines by the sudden opening of the large steam valves, a force must be transmitted to the piston of a kind distinct from that of the steam's simple elasticity. This force he denominates the steam's *percussive action*; he adduces various proofs that this description of force has operated on the piston, and that it alone was equivalent, in the instance of the Fowey Consols engine, to drive the piston through 27-100ths of its stoke.

"The author considers the effect produced on the piston of a Cornish engine, by the sudden impact of highly elastic steam, to be similar to that obtained from water in the hydraulic ram. He has not in his paper entered on the consideration of the absolute amount of percussive force which can be afforded by an aeriform fluid in motion, but has confined himself to the determination of the quantity of action which he conceives to have been derived from that source in the particular engines examined. He invites the co-operation of others in instituting experiments on this subject; and the council hope that the ensuing session will augment the number of facts requisite for the complete demonstration and development of this view of the steam's action.

"Among the other communications, the council would briefly advert to that by Captain Basil Hall, 'On obtaining for Lighthouses all the advantages of a fixed light by means of refracting lenses in revolution.' It occurred to that distinguished officer that by placing a Fresnel lamp in the centre of an octagonal frame, having a lens inserted in every side, and causing the frame to revolve at a considerable velocity, a fixed or continuous light would be produced almost equal in brilliancy to the intermittent light from the same lamp when the frame revolved slowly.

"Many curious effects are observed. Thus, when the lenses are first set in motion, the effect is a series of brilliant flashes; as the velocity increases, the light becomes more continuous; at about forty-four revolutions per minute, absolute continuity is produced; and at sixty revolutions, nearly the steadiness of a fixed light is attained. It would appear that the sensibility of the retina is

affected by the succession of bright flashes; so that, judging by its intensity when seen through coloured glasses, the light would appear to suffer but little apparent diminution.

"Another subject rather novel in its nature, but of considerable interest to the profession, 'On the Application of Photography to the purposes of Engineering,' was brought before the institution by your member, Mr. Alexander Gordon. The facility with which this discovery may be applied to taking accurate views of buildings, works, or machinery at rest, renders it an object of great interest to engineers; since by these means may be obtained the general dimensions of works, with perfect accuracy, in a very small space of time; and, by fixing a graduated scale to the objects to be copied, the photographic delineation would present the means of determining the dimensions of every part.

"The council cannot omit this opportunity of acknowledging the obligations which the institution is under to Mr. Cooper, and to Mr. Cooper, jun., who illustrated the preceding communication, by exhibiting and explaining the apparatus requisite for the production of the delineations of photography.

"The council have to acknowledge the receipt of many valuable presents during the past year; and to record the liberality and zeal thus exhibited in the promotion of the interests of the institution."

SCIENTIFIC MEMORANDA AND NOTES ON ART.

Dissolving Views by Hydro Oxygen Light.—A remarkably pleasing and altogether new application of the powers of hydro-oxygen light is at present absorbing the attention of the visitors at the Royal Polytechnic Institution, where it was first exhibited on Easter Monday. The exhibition consists in displaying on the large disc in the theatre of the establishment a series of magnified pictures, properly called "dissolving views;" the effects of which are absolutely surprising to the last degree. What we ourselves saw we will endeavor to convey to the imagination of the reader by description. The first picture represented three line-of-battle ships, one English and two foreign, preparing for engagement. On a sudden, and by imperceptible means, the commencement of the action was indicated by the appearance of large volumes of smoke. These, in turn, were succeeded by a representation of the conquered foreign ships in a crippled state; their yards shot away, their rigging floating about, and the standard of England flying from the remaining stumps of masts. This accomplished, the vessels faded from the vision, their receding shadows giving place to a view of Greenwich Hospital from the river, with yachts and steam-boats at anchor. These changes are so nicely graduated that the eye scarcely recognises the illusory transformation. One of the most pleasing series of views was that in which were represented the old Royal Exchange, with its subsequent destruction by fire, the appearance of the ruins, and the (to be) new building. These changes were brought about as if by magic, the second taking the place of the first as if it actually grew out of the canvas, for the purpose of displacing its successor. Altogether we saw eighteen of these metamorphoses. The effects we have alluded to are produced, not by mountebankism, but by science. Messrs. Cary, the celebrated opticians, are the inventors of this new and very charming application of the powers of a well-known chemical light; and their *modus operandi* is the result of philosophical principles.—*Morning Post.*

United Service Institution.—On Tuesday afternoon Mr. Addams concluded his series of four lectures on voltaic electricity. The last was confined to the principles of the electrotype, and of the new art of plating and gilding by means of the galvanic or voltaic battery. His treatment of the subject was well suited to the minds of a mixed audience, and the administering to the eye was judiciously mingled with sound for the ear and facts for the sense. The former, besides the evidence of depositions of metal by chemical affinity, and of the power obtained over metallic precipitations by an improved knowledge of the working of the galvanic battery, and of the application of this power to the production of works of art, included the throwing down an oxide, from a solution of the acetate of lead, on polished steel plates, and bringing the irridial colours known in optics as Newton's, and in electrical science as Nobili's rings, and which have been recently made familiar and explained by M. Gassiot's experiments. The beautiful effects have been termed metallochromes, which may be explained to be colors called into existence by the action of light on the thin and varying films of the oxide of lead deposited on the steel surface. They present the brilliancy of the solar prismatic spectrum, and can be fashioned into almost any pattern. Palmer's original large electrotype plate and engraving of Knox admonishing Mary Queen of Scots was exhibited; also Elkington's superb specimen of silvering a central piece for the table. The silver has been thrown down on a highly-finished brass mould, and the result is such as no other method of plating could produce.

A Safety Kite at Sea.—The wind being south, with strong breezes, a trial was made last week, at Sandgate, of the Mariner's Safety Kite, by W. Walker (of the mounted revenue guard), before Lieut. Batt, R.N., and several experienced nautical men, and found to answer in every respect the purpose for which it is designed. It may be as well to add, that a wreck having taken place on the 13th of November last, at Dungeness, when two lives were lost in consequence of the high sea preventing any communication from or to the shore, the idea of a kite on board the wreck, so as to be lowered at will when over the land, first struck Mr. Walker as the most feasible and certain method of rescue. This has been accomplished in such a simple manner that a child might manage it with precision, rising and falling within three feet of the earth, again rising without assistance, carrying out one hundred fathoms of line, if necessary. Communication in the instance of shipwreck at Dungeness would have been the means of saving the crew, had a "kite" been on board. Even uninhabited shores might be reached by an ordinary swimmer attaching the line under his arms. A light is attached to the tail, which neither wind nor rain will extinguish, to be used at night, so that persons on shore may see the kite's position.

Discovery in Animal Chemistry.—The principles fibrin and albumen, which play so important a part in the constitution of the animal solids, are now, on the authority of Liebeg, stated to be identical. M. Denis has communicated a letter to the Academy of Sciences, in which Liebeg states that he has been able to dissolve fibrin by a moderate heat in a saturated solution of nitre, and that the fluid has all the properties of solution of albumen.—*Provincial Medical and Surgical Journal.*

Double Offset Plotting Scale.—The silver medal was presented by the Society of Arts to Mr. James G. Austin, for his Offset Plotting Scale, for the use of civil engineers and surveyors. It consists of two perfectly parallel graduated scales, whose distance is equal to the length of the offset scale, which runs on rollers between them. The parallel scales and the offset scales are graduated to suit the views of the user. The pieces connecting the ends of the double scale are hollowed out to receive the weights, armed with points to enter the paper, which hold the instrument in its place, and prevent its being shifted while in use; and from the centre of each of these connecting pieces projects an index; the points of these indices, and the zero of the offset scale, being always in the same straight line, which is, of course, the line from which the offsets are to be measured. —*Trans. Soc. Art. Lond.*, 1841.

VARIETIES.

By command of His Royal Highness Prince Albert, Mr. Dent, of the Strand, attended at Buckingham Palace, on Tuesday, to exhibit and explain his newly-patented Chronometer and Astronomical Clock; also his working models.

The Railroad Murder.—Three men who were charged with the murder of the superintendent of the laborers on the Edinburgh and Glasgow railway, in December last, were tried and convicted on Friday. Sentence of death was passed on the culprits, two of whom it is expected will be executed at the spot where the murder was committed. One of them was recommended to mercy, on the ground that he had not taken an active part in the attack. They are all Irishmen.

Miscellaneous Estimates, &c.—This branch of the estimates for the public service, just published by order of the House of Commons, is divided into five parts. The first part includes the sums required for public buildings and royal palaces, the new houses of Parliament, and various other items, which amount to £311,132. The second part includes the sums required for the salaries and expenses of public offices, prisons, commissioners, inspectors, &c., which amount to £630,438. The third includes the sums required for superannuation allowances, the vaccine establishment, &c., which amount to £106,931. The fourth part includes the secret service money, convict expenditure, the London University, and various other items too numerous to be specified, the total amount required being £1,045,657. The amount required for secret service money is £39,200. The fifth part includes the sums required for various civil establishments, &c., which amount to £239,022. Thus the aggregate amount of the entire miscellaneous estimates for the year 1841-42 is £2,333,180.

Post Office Profits.—It appears from Parliamentary returns just published, that the net revenue of the first year of the penny postage is above 33 per cent. profit on its gross revenue. The number of letters posted in the United Kingdom averages 750 per minute, according to the Parliamentary returns just published, assuming that the post-offices are open 12 hours each day.

Reduction of Duty on Neapolitan Oil.—Among the reductions of import duties to be proposed by ministers, is that on Neapolitan oil. The present duty on that commodity is the enormous sum of £4 4s. per tun. Mr. Macgregor, in negotiating his commercial treaty with Sicily, which Lord Palmerston rejected, agreed that Great Britain should reduce this duty to £3 3s. per tun. But in return for this, and seven other reductions of duty on Neapolitan and Sicilian produce, the *Sicilian import duties would have been reduced on seventy-two British articles.—Journal of Commerce.*

Reduction of Discount in Ireland.—The Irish banks generally are reducing their rate of interest on discounts. The Bank of Ireland have just issued a notice, announcing that the interest on discount of all bills is reduced from six to five per cent.

Longevity in Russia Explained.—A statistical economist, who knows nothing of the internal arrangements of the province, must be sadly puzzled to account for the extraordinary tenacity and vigor of the vital powers, and healthful influence of the climate, and the astonishing greatness of the average duration of human life in Bassarabia. The problem is, however, easily solved when the contrivance of the civil authorities to increase the numbers within their municipal jurisdiction is understood. A refugee appears and prays to be enrolled as a Mesnechanin—that is, a citizen of the town. He is at first told, "That is not a matter of course, friend; you have no passport, too: but wait awhile, and we will see what can be done for you." The refugee waits until one of the civic community dies, and then he is summoned to appear again before the Red Table, in the magisterial office. Now the business proceeds thus:—"What is your name?" "Ivan Gritshov." "What age?" "25." "Well, young man, attend to what I am going to say—Mitrophan Kalenko died yesterday, aged 50; if you wish to be a citizen, you must take upon yourself his name and his age, then we will allow you to be substituted for him, and will give you his certificate and other documents." Ivan Gritshov joyfully consents, and becomes all at once a respectable citizen of a very respectable age. The departed Mitrophan still lives under this metamorphosis on the civic register, and, probably, after two or three other renewals of his existence, dies at the patriarchal age of 150. We need, therefore, no longer marvel at the frequent accounts of deaths in Russia of persons exceeding 100 years of age.—*German paper.*

Royal Institute of British Architects.—On Monday evening the President of the Royal Institute of British Achitects, Earl de Grey, opened his house for the reception of the members of that society. The council had the honor of dining with his Lordship, and the *conversazione* which followed was attended by a numerous party of noblemen and gentlemen eminent in art, science, and literature. The Marquis of Lansdowne, Lord Prudhoe, Mr. Baron Parke, Mr. Rogers, Sir E. Cust, Sir H. Halford, Sir H. Ellis, Sir R. Westmacott, Sir F. Chantrey, Sir F. Madden, Sir G. Wilkinson, Sir J. Rennie, Professor Willis, the President of the Institute of Civil Engineers, Mr. A. Cunningham, Mr. C. Fielding, Mr. Harding, Mr. Haghe, and Mr. Joseph Nash, were among the guests. A small party of ladies were also present, including the Duchess of Northumberland, the Marchioness of Lansdowne, &c. The tables were covered with works of art.

The Phœnix and Britannia Steamers.—The circumstances of the collision between these vessels in the British Channel, off Dungeness, on the night of the 25th October last, when the former was so much injured that she sunk within a quarter of an hour, have formed matter for discussion in the French Courts since that time. The Tribunal of Commerce at Havre, which had been declared competent to try the case, has been occupied for some weeks past in privately examining the various documents connected with it, after a first hearing of the parties. On Saturday this court delivered its sentence, the text of which we find in the *Havre Journal.* After recapitulating the evidence, whereby it appears that the fault lay on the side of Captain Stranack of the Britannia, who was coming up channel with wind in his favor, and all sails set, but with only one light at his foremast, and that Captain Lefort, of the Phœnix, was going down channel against the wind, without any sails, and with three lights at his paddle-boxes and foremast; and further, that from the evidence of the steersman, and the sworn examiners, it appeared that the captain of the Britannia did not see the Phœnix till he was close upon her, while the captain of the latter was aware of the Britannia's coming, though he could not judge of her distance from her carrying only one light, but that he had done all he could to get out of her way; and also since the reports of the examiners at London, when they visited the Britannia, proved that it was this vessel which ran in upon the Phœnix, and not otherwise, as had been alleged; therefore the court decided that the General Steam Navigation Company was liable to the company owning the Phœnix, for the loss of that vessel. In consequence of this the court adjudged that the former company should pay to the latter 700,000f., with interest from the time of the demand being made; or, as an equivalent for this, that an offer which the former company had made, of giving up to the latter, within a specified time, the Britannia steamer, with all her engines, &c., complete and good, together with the value of the freight on board the Britannia steamer at the time, and the produce of her passengers' fares (about £90), should be accepted; and that this should serve as a bar to any further proceeding or other claims.

A New Element of Railway Traffic.—North Midland Railway.—In consequence of an order made by the magistrates, all prisoners committed to the Riding House of Correction, at Wakefield, from Sheffield and Rotherham, are in future to be conveyed to that prison by railway in lieu of coach; the average number is about sixteen weekly.

Inland Warehousing Bill.—This bill, brought in under the auspices of the Board of Trade, proposes to enact as follows:—viz., 1. That it shall be lawful for the Commissioners of the Treasury to appoint warehousing towns, and also to appoint the places or premises which shall be the warehouses at such towns, and to require such securities and conditions, respecting such warehouses and the goods lodged therein, as they are empowered, by the 3d and 4th William IV., c. 57, to require, &c. 2. That all goods which are to be taken from the warehouse in any port to be lodged in the warehouse at any town shall be removed upon the conditions and under the rules, &c., directed and provided by the said act in respect of goods removed from one warehousing port to another, &c. 3. That the Treasury shall make annual returns to Parliament, &c.

A Chinese Map of the World.—A tolerable idea of the state of Chinese geography may be gathered from a glance at a map of the world produced by them. It is two feet wide by three and a half high, and is almost covered with China! In the left hand corner, at the top, is a sea three inches square, in which are delineated, as islands, and of very small size, Europe, England, France, Holland, Portugal, and Africa! Holland is as large as all the rest, and Africa is not so big as the top of one's little finger. The northern frontier is Russia, very large.

The Capercailzie.—This beautiful and very remarkable species of game, once common in the highlands of Scotland, having many years ago totally disappeared there; and being discovered in Sweden, the Marquis of Breadalbane sent an experienced gamekeeper to that country, who, after much exertion, succeeded in procuring "a breed," and bringing them alive to his Highland estate. Carefully observing their habits in Sweden, and ascertaining their instinctive relish for particular kinds of nutriment, the gamekeeper has succeeded in propagating them. A cock, with four hens, were lately given to the Marquis of Douglas and Clydesdale, who has forwarded them to Arran, where there is every probability they will become abundant.—*Glasgow Evening Post.*

The Protective System.—Nutmegs, if imported from Holland directly for home consumption, are liable to a duty of 3s. 6d. per pound; but are allowed to be imported, under bond for exportation, without payment of duty. From London they are sent to the Cape of Good Hope, and are thence re-imported to England, and are then admitted for home consumption on payment of a duty of 2s. 6d. per pound, as coming from a British colony, from which proceeding, a gain of 7d. or 8d. per pound accrues, as the whole expenses of freight, insurance, &c., from London to the Cape and back again do not exceed 4d. or 5d. per pound.

Coal Pit Explosion.—On Tuesday morning last, about five o'clock, an explosion of fire damp took place at Newton Lane End Colliery, belonging to Messrs. Charlesworth and Co. near Wakefield. It appears that a man, who was acting in the place of the bottom steward, was descending the main-shaft, preparatory to the colliers going down to their work. He had a Davy lamp in his pocket, which, it is generally supposed, was either out of order or placed in a very careless position, and when he had got about fifteen yards down, the inflammable gas rising from the pit met him, and the explosion took place. The corve in which he was standing was blown to atoms, and the unfortunate man was precipitated to the bottom, a distance of 180 yards. Fortunately there were no workmen in the pit at the time, with the exception of two who were at work in a distant part of the works, but who heard nothing of the explosion. The conducting rods, which descend to the bottom of the pit, were broken in three places, and various injuries have been done to the sides of the shaft. The explosion was distinctly heard in Wakefield, and for miles round; and several of the windows in Newcastle were broken completely out.—*Sheffield Iris.*

ADVERTISEMENTS.

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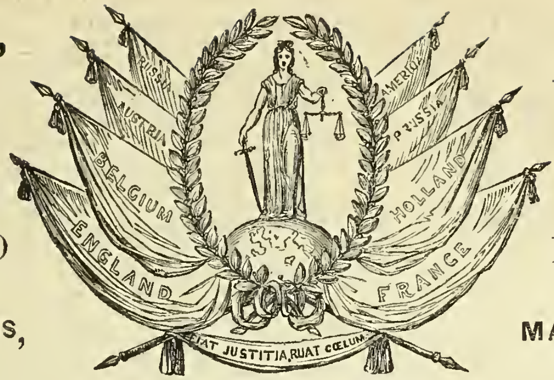

No. 93.] SATURDAY, MAY 8, 1841. [PRICE FIVEPENCE STAMPED. CIRCULATING FREE BY POST.

APPLICATION OF ELECTRICAL TELEGRAPHS TO RAILWAYS.

The invention of the electrical telegraph is so recent that it is impossible to appreciate the full extent to which it may be usefully applied; still less can it be expected, that in the present infancy of the invention it can be rendered practically available even to those purposes which more immediately suggest themselves as most desirable of attainment. Some time must elapse before improved facility and greater cheapness of insulating the wires and laying them down, render this means of communication generally useful; but in the meantime, there are methods of applying the transmission of signals by this lightuing-speed, which are not only practicable by the present known processes, but would be attended with great advantages and saving of expense.

The object to which we now more particularly refer, is the application of the electrical telegraph in the working of railways. A telegraph of this kind has, indeed, been laid down on the Great Western railway, and important advantages have been found to arise from its use; but we believe the purposes to which it has been applied are few, compared with those to which it might be made available; and the scale of its operation is as yet very limited. It appears to us, that this mode of transmitting signals from station to station offers a complete safeguard against all accidents from collision; and likewise presents the means of working single lines of railway with a security far exceeding that which a double line of rails now possesses. If, therefore, by the extended application of this ingenious contrivance, one of the greatest dangers of railway travelling can be avoided, and if, further, a single line can by this means be made equally serviceable as a double line of rails, it will contribute more effectually to the improvement and extension of the railway system, than any other invention since that of locomotive engines.

To obtain all tho advantages which we propose to derive from the use of electro-magnetic telegraphs in the regulation of the trains on railways, they must, in the first place, be regarded as essential requisites of the system, and not as occasional adjuncts. They must be the regulators of the times of starting at every station, and the correctness and constancy of their action should constitute as important an element in railway transit as the proper working condition of the locomotive engines. Assuming, therefore, that lines of telegraphs communicating from station to station in a line of railway are thus efficiently established, we will point out the mode by which a single line of rails might be worked with perfect freedom from danger of collisions, and with very trifling occasional delays.

It would not be absolutely essential that any difference should be made in the present distances of the stations from one another, but it would facilitate the operations on a singlo line wero the stations fixed at smaller and more regular intervals. We will assume that on a line of one hundred miles there are twenty stations, each five miles apart. Every station should be provided with side rails, to enable an engine and train to turn off the line, to allow other trains to pass. Suppose on a line of this kind a train were to start from each end every hour, and to complete the journey in four hours; then each up-train would meet and pass four down-trains; and if their speeds were regular, their places of meeting would be twenty-five miles apart. This regularity, however, would not be essential to the working of the line.

We will supposo that a down-train starts from London at eight o'clock; after receiving a telegraphic signal from the nearest station that the line was clear, and a communication being returned that the train had started. The proper signal would then be hoisted at the first station to indicate to any up-train that the line was not clear; and if Mr. Hancock's railway controller were adopted, the bar might be raised which would turn off the steam when the lever of the engine struck against it, and thus stop any approaching train, and turn it off on to the side line of rails. This meeting of trains would not, however, be likely to occur on tho line at the first or second stations. We will suppose the down-train to arrive at the fourth station before the approach of an up train. After performing a distance of twenty miles, therefore, the signal of obstruction causes the down-train to turn off the line, and wait the arrival of the other train. This time would not, in any circumstances, exceed twelve minutes; oven supposing the up-train to have only just quitted the other station. The average time of waiting may be estimated at six minutes; and as we assume there are four points of meeting, this would amount on a journey of one hundred miles to twenty-four minutes. But as only one of the trains would have to wait whilst the other pursued its journey, the average number of stoppings divided between the four points of meeting would be only two. This, therefore, would not make the total delay exceed twelve minutes; and in those times of stopping the usual changes of passengers would be effected, so that the time actually lost in waiting for the trains to pass would be still further diminished.

To avoid the possibility of collision between two meeting trains, no train should leave any station until a signal of safety was made after communication by telegraph with the station in advance. The telegraphs should be kept constantly at work, to announce to the next stations, both up and down the line, not only the arrival of each train, but its approach and departure; and these communications should be transmitted from time to time along the whole line; especially if there were any variation from the proper times of arrival.

As the persons at each station would thus be informed the instant the train started from the station nearest to them, they would be able to calculate within a minute when the train would arrive, and thus warn the persons at the farther station before the train came up; whilst, if the communication were constantly kept up through the whole line, the situations of every train travelling on the road could be accurately known at each terminus and at every station.

If in case of accident from the breaking of an axletree or any part of the machinery, or from defect of the rails, the train should be stopped between any station, the accident would be known at the furthest within twelve minutes, by the non-arrival of the train, and assistance could be sent from both stations. It is only in cases of obstruction from accident or from want of repairs in the road that we conceive any difficulty would arise from thus working a railway with a single line. To these obstructions, however, even with a double line of rails, the traffic is not unfrequently subject, and we anticipate that great improvements will shortly be made in the manner of removing obstructions from the rails, which is at present one of those branches of railway mechanism that seems very defective.*

* As an instance of the want of proper arrangements for lifting carriages on to the rails after they [have run off.

Having thus pointed out the great advantages to be derived from the electro-magnetic telegraph in working a single line of railway, so as to insure perfect safety from collision, and very trifling delays, its utility on double lines need scarcely to be dwelt upon. The importance of the signals is not indeed so great on a double line, as two trains are supposed never to be travelling in opposite directions on the same line; but the frequent accidents that have arisen from one train overtaking another would never have occurred had proper warning been given to the following train of the distance in advance. Though a double line of rails affords considerable facilities, yet it is in many respects attended with greater dangers than a single line would be if worked on the plan we propose; but the dangers might be materially diminished by multiplying the number of telegraphic stations, and by extending the use of that instrument, so as to keep up a constant correspondence between all points of the railway. Numerous modes would suggest themselves of varying and multiplying the signals, so as to diminish the chances of danger, were a chain of telegraphs efficiently formed, and worked as a regular part of the railway system. Our object is now only to point out some of the numerous ways in which the electro-magnetic telegraph might be made available, as we feel assured that no railway ought to be without this important element of safety, and that it is calculated to produce most important effects in the establishment of a speedy, safe, and cheap railway communication between all parts of the kingdom.

ON THE SINKING OF ARTESIAN WELLS.

L'Emancipation, Brussels paper, which has on several occasions directed its attention to the best plans to be adopted in boring the ground either in search of minerals or of water, has a long article on the subject, founded on the recent operations at the well of Grenelle, respecting which it collects most of the interesting details. From this article we make the following abstract:—

"The instrument which is fastened at the bottom of the sounding rod, and which immediately penetrates the soil, is changed every time that the nature of the soil varies. A heavy substance, acting merely by its own weight, is capable without further effort, of penetrating soft soils that do not offer much resistance; but when it arrives at more impenetrable substances, such as hard chalk or rocks, it is necessary to make use of a tool that will break and shatter the parts of the rock that are to be penetrated. It is afterwards requisite by means of another instrument, which is also fastened to the extremity of the sounding rod, and which has been denominated a *curette*, to remove and carry away the fragments of stones detached by the chisel. Such is the principle on which all sounding operations depend; let us now consider the most obvious difficulties.

"The sounding rod soon becomes of great length; it is composed of separate rods connected together. Every time that the chisel is raised in order to admit the curette, or alternately, it is necessary to take all the parts of the rod to pieces one by one, so that they may be raised above the orifice of the well, to be joined together again when the sounding rod is again sent down. This part of the work, which does not require any very great precaution, and which is purely mechanical, is, notwithstanding, one of the greatest obstacles to the extension of Artesian wells. It is in fact this business which occupies the greatest part of the workmen's time. After continuing to work with the chisel for about an hour the sound is obliged to be raised and taken to pieces, in order to bring it up, and the work is to commence again; and in wells of great depth, two days are requisite for one of these operations; that is to say, it requires two days' labor to penetrate the depth of a few inches. It will easily be understood that the separating and joining together of the rods, are much longer operations when the well is deep.

"A second difficulty is that of striking the bottom of the well with an iron rod, of such great length, and which must consequently be so heavy. It is therefore requisite to have recourse to powerful machines, and the assistance of a great many workmen in order to move this heavy weight. During the latter part of the operation the sounding rod of the well of the Abattoir of Grenelle at Paris weighed seven thousand kilogrammes, and this enormous mass was obliged to be raised after each successive blow struck at the bottom of the well.

"Yet we must add that in our opinion it would be possible to remove some of the secondary difficulties which arise from the action of this enormous mass. When it falls down again the chisel weighted with too heavy a weight, is not able to act to advantage, and the sounding rod, on account of its extreme length, moves about and knocks against and injures the sides of the well. It was three times even broken. It is these inconveniences which we say may be partly remedied. We will state in what manner. The plan, indeed, has already been adopted with success.

"If the sounding rod could be divided into two parts, fastened to each other in such a manner that the lower rod would necessarily be obliged to be raised at the same time as the upper one, but so contrived that it could be let down separately, the difficulty would be removed. The lower rod, that to which the chisel is immediately fastened, may be lengthened or shortened as required, and can always be appropriated to the different kinds of soil. When the upper part of the sounding rod is raised, the other part with the chisel are raised also. But after having raised all the apparatus in this manner, the lower part can be let down separately, which is sufficient to give the chisel the impulse required.

"This plan was not adopted in the well of the Abattoir of Grenelle, M. Mulot, who directed the execution of it, persevered in the old system; he wished to finish his undertaking on the same principle as that on which it was commenced. It was in 1833 that Paris commenced preparations for completing the watering of the public streets, and for conveying water into private houses. The distribution of the water in Paris is still confined to one part, though to a very considerable part of that great city; to render it of general utility it is going to be completed. Till the present time there have been six principal sources whence water has been drawn for distribution in Paris. The most important of these is the canal of Ourcq, which supplies the greatest part of this capital, but this water when in a natural state is not drinkable, which is a serious inconvenience.

"Seven years had elapsed when on the 26th of February last, water spouted up from the well of Grenelle. The depth of the sounding is 347 metres; the water is ejected with considerable force. The iron pipe which contains it is 18 centimetres in diameter at the bottom of the well, and 53 centimetres at the orifice. It is therefore a volume of water 53 centimetres in diameter which is seen to rise above the ground.

"The elevation which this water might naturally attain would be very considerable if the jet were confined by a smaller pipe. By this means it might be raised more than 10 metres above the ground. But as the jet is not confined, it soon breaks, turns back, and falls in torrents on all sides.

"The force of the pressure which raises the body of water, and causes it to spout out, must be immense, and almost inconceivable. It is equal to a pressure of 53 atmospheres, which is ten times greater than that of our high pressure steam-engines. When the column of ascending water arrives near the surface it still retains a mechanical power which could be made of use without interfering with the ultimate destination of the waters. Scientific principles, and an acquaintance with that singular law of the equilibrium of fluids which has been pronounced the hydrostatic paradox, can alone explain whence such a power arises.

"The quantity of water thrown out daily at the Artesian well of Grenelle is 4,320 cubic metres. Paris is going to derive the advantage of watering the public streets from this new source, and of distributing water into dwelling-houses. But this consideration is not the most important one to us. What we consider as the most remarkable consequence resulting from such an immense undertaking, which has been attended with an expense of not less than 460,000 francs, is that Artesian wells in soils which geologists denominate tertiary, will always succeed.* Examples daily more numerous may be alleged in support of this important law. But we will add that by an improvement in the method of proceeding, and in usual soils, similar wells may be bored even of equal depth at considerably less expense.

"There is something uncommon in the manner in which Paris has rewarded the exertions of M. Mulot. It is true that it is the first example in France of the government causing so great a work as this to be undertaken; but this is no reason for considering a fact which took place under such peculiar circumstances as a general rule, and the result of which is of so much importance."

PROPERTIES OF THE HUMAN VOICE.

The following is an extract of a report to the French Academy of Sciences on a memoir presented by M. Manuel Garcia, on the properties of the human voice. The reporter of the committee appointed to examine the subject was M. Dutrochet, the other members of the committee being Messrs. Magendie, Savary, and Savart.

"The theory of the formation and variation of sounds by the human vocal organ is far from being perfect; it is even a disputed question to which instrument the human voice can be best compared. The majority of philosophers, however, have considered it as approximating to the kind of wind instruments in which the sound is produced by the vibrations of certain elastic bodies.

"However this may be, the vocal organ is so perfect, it produces effects so wonderful and various, that we are induced to think it is not a single instrument, but that it possesses the wonderful capacity of changing itself incessantly into a number of different instruments. To witness it, for example, as manifested in the voice proceeding directly from the lungs; and again in the falsetto voice; would it not be said that these two kinds of sounds are produced by two different instruments, substituted one for the other? As we approach the point where these two voices unite, where the lowest notes of the falsetto voice succeed the highest notes of the natural voice, there are many notes which may be produced equally well by using either one or other of those voices. This fact was first noticed in Dr. Rush's work, entitled *Philosophy of the Human Voice*. The facts submitted to us by M. Manuel Garcia have fully confirmed this assertion. This able professor of singing has instructed some of his pupils in the art of managing

we may mention that on one occasion we observed, when two *empty* wagons got off the line at the Camden-town station, near to the workshops, and when all hands were called out to assist, it occupied a full hour before the obstruction could be removed, and the efforts made seemed of the very rudest kind.

* In an article on Artesian wells, No. 87, of your Journal we pointed out the circumstances necessary to success in boring for water, and showed that the level of the ground as well as the nature of the strata, is an important element to be taken into consideration.

their voices with such facility, that they can separate distinctly, and at will, the sounds of the falsetto voice. We heard both male and female voices, which, after having reached the highest of their natural notes, commenced the falsetto voice, to raise the notes still higher, and then descended the scale, still preserving the falsetto, until they reached below the limits to which the natural voice extended; so that the same diatonic sounds which had been produced in ascending the scale with the full voice, were produced in descending by the falsetto voice. The extent of the scale which is within the range of both voices is variable in different persons, according to the qualities of their voices, or the facilities they have attained in managing them. Most commonly, the extent is from a sixth to an octave, and sometimes it reaches to a tenth. According to M. Garcia, this portion, which is common to the two scales, is the same for female as for male voices.

"There is no doubt, after these facts, that the voice from the breast and the false voice are each produced by a particular and important modification of the vocal instrument. This conclusion is further confirmed by an observation of M. Garcia, to the effect that the quantity of air or breath required to produce the same note by the full or the false voice differs materially. This M. Garcia demonstrated by the following experiment. A singer having his lungs as full of air as they could contain, sounded a certain note within the common scale with his natural voice, and prolonged it till his breath was exhausted. The metronome, which indicated the time, made during the prolongation of the note from twenty-four to twenty-six vibrations, whilst it only made from sixteen to eighteen vibrations whilst the same note was sounded with the falsetto voice. From this it appears that the human voice expends more air in producing the false than the natural voice.

"The full and the falsetto voice, whilst each preserves its peculiar mode of production, present two principal varieties in their tone; which M. Garcia designates as the clear and sombre tone, (*timbre*)."

The committee, in concluding their report, pay a compliment to M. Garcia, and observe, that the many interesting facts noticed in his memoir deserve to be considered in the physical theory of the human voice.

ON THE ACTION OF METALLIC TIN ON SOLUTIONS OF MURIATE OF TIN.

BY AUGUSTUS A. HAYES.

It has been long known to those who frequently dissolve tin in muriatic acid, that under some circumstances the metal after it has been dissolved is precipitated. It sometimes presents large sections of octahedral crystals; at others, long prismatic needles, which are so arranged as to form skeletons of such sections. The interest which has been excited of late by notices of the non action of metals in acid solutions and in relation to chemical action of a similar kind, has induced me to publish the facts which I some time since observed.

When tin is dissolved in muriatic acid, either by gradual action under exposure to air, or by the aid of heat, a solution containing an excess of acid is obtained. This solution may be concentrated to a sp. gr. = 1·750, and retains its fluid form at or above 60 deg. F. Although an excess of tin is present, the solution thus obtained is always acid. After decanting the clear solution, the tin used in excess with its impurities remains. Generally, after a few days' exposure, the matters left in the solution vessel change in appearance. The dull corroded fragments of metal become frosted over with bright needles of tin, and beautiful arborescent forms are seen. On studying the circumstances, I have found that the effect is due to electrical action. One portion of the undissolved tin becoming a positive electrode, while another portion of the same mass assumes the state of a negative electrode, and precipitation of the dissolved tin takes place on it. Numerous cases of like action are known to chemists, where a part of a bar becomes indifferent to a concentrated solution, although a positive state is exhibited at another part, and active solution of the metal is taking place.

For the purpose of experiment, a solution of muriate of tin, of sp. gr. about 1·650, contained in a cylindrical vessel, may be carefully covered by half its volume of an acid solution of the same, having a sp. gr. about 1·20. The two fluids should not be mixed more than the slight diffusion which will take place. After placing a flat bar or plate in an inclined position, so that it passes through both solutions, the effects become immediately perceptible. That part of the bar which is within the diluted solution takes the positive state. A few minute bubbles of hydrogen form and escape, if the solution is quite acid. Precipitation of metallic tin commences near the line of contact of the two solutions, and extends throughout that part of the bar immersed in the denser solution. If the diluted solution is not rendered acid by the addition of acid, hydrogen is not perceived, and the action is more gradual. In either case the precipitation continues until the two fluids have attained the same electrical relation to the bar. If after the precipitation has ceased water be carefully poured upon the surface of the fluid, it will form a stratum of very dilute solution. That part of the bar not before immersed takes the negative relation to this solution, and the same kind of precipitation follows as had taken place in the lower solution. The positive part of the bar retains its state unaltered under the new conditions, and the line of separation is as clearly defined as in the first case. If a solution mixed with crystals be used, instead of a moderately-concentrated solution, they are not decomposed under the above conditions. The presence of atmospheric oxygen has been supposed to influence this action. Such is not a correct statement; by exposure to atmospheric vapor, strong solutions of muriate of tin become weaker, and any masses of undissolved tin, projecting into the weaker solution, will decompose the denser solution below. In numerous trials, I have found all the cases of precipitation referable to different states of two solutions resting in contact.

MANUFACTURE OF IRON IN NORTH AMERICA.

A correspondent of the *Mining Journal* contradicts a statement recently published in that journal of the abundant supplies of excellent iron in Maryland, North America. "Having," he says, "myself visited the different works in the State of Maryland, and been personally acquainted with the proprietors of the same, I do not hesitate in offering you the information I from them received. Undoubtedly the iron ore abounds in the State of Maryland to some extent, but certainly it is not of that very superior description one would be led to suppose from the statement referred to. In the works I visited, during my stay in Maryland, the proprietors were invariably very much dissatisfied with the result of their business—indeed, so much so, that they talked of abandoning them entirely; they find it impossible for them to compete with the manufactories in this country, and this it will be useless for them to attempt, for so long as the import duty does not exceed the present rate, so long will our manufactories be enabled to furnish it them at a much lower rate than it can possibly be manufactured by them. Maryland being a slave state, the labor has for the last four years been almost exclusively carried on by the blacks, who, you may not be aware, are unquestionably the most expensive laborers that can be employed. Previously to this these mines were worked by Welshmen from the hills of Tredegar—hence the name of the Tredegar Iron-works is to be found at an extensive establishment near Richmond, in the State of Virginia. The proprietors gave it this name, thinking it might induce persons from this part of the country to go there—and many did go there, but few of them were satisfied with the change. They soon perceived the difference between the Tredegar Iron-works of the States and those of Wales. The wages they received were undoubtedly high, but the great expense of clothing, &c., and more particularly the extra labor required, owing to the incompleteness of the machinery, caused them to be dissatisfied. They found that instead of being able to accomplish all their work by machinery, as they did at Tredegar, they were obliged to have recourse to manual labor. In consequence of this the Welshmen deserted, and they were obliged to employ the unfortunate slaves, who know but little of such occupation.

PROPOSED RAILWAY SYSTEM OF IRELAND.

(From the *Railway Times*.)

It gives us great satisfaction to be able to announce, on the best authority, that a plan has been at last matured, and *has received the sanction of Government*, by which the benefits of the railway system will be speedily extended to Ireland, on a large and comprehensive scale, *independently of any aid from the public purse*, and with no more of Government interference than will conduce equally to the protection of private interests and of the public weal. All that is asked by the plan we speak of is an Act of Parliament with powers to enable Ireland to borrow, on the credit of *her own resources*, money enough to give her facilities of intercourse and transport equal to those of England and Scotland; and such powers we hold it to be impossible to refuse.

The leading principle of the present plan is such *a combination of private enterprise with Government superintendance and regulation* as shall procure for Ireland a general railway system at the least possible cost.

To *raise the capital required*, which is the first important thing to be done, it is proposed to offer to private individuals disposed to advance it, the following advantages:—First, four per cent. per annum *certain*, to be secured on the Irish county rates; and second, one-half of the profits arising from the railways executed with the capital furnished, exceeding the sum necessary to pay the four per cent. so secured in the first place. We are happy to add that a body of London capitalists of the highest eminence have already come forward with an offer of all the capital wanted on these terms. At the head of the list are the names of Mr. Alderman Thompson, M.P., John Abel Smith, Esq., and Isaac Lyon Goldsmid, Esq.

The *inducements to the Irish counties* to guarantee the payment of the four per cent. certain are many and obvious, but we shall content ourselves with pointing out a few of the most prominent. First, it is proposed to appropriate to the counties the remaining half of the surplus profits of the railways after payment of the four per cent. The traffic estimates of the Irish Railway Commissioners in 1838-9 would not warrant us in anticipating above four per cent. from more than a very few Irish railways, but it has been generally allowed that these estimates were a great deal too low, and to any one who doubts this we recommend an attentive perusal of a very clever dissection of them in the last number of our Birmingham contemporary, the *Railroad Monthly Journal*. Sooner or later, we have not a doubt that the half of the surplus profits falling to the share of the counties would be so considerable as to enable them, not only greatly to reduce their present rates, but to lay out large sums in local improvements. We have seen, in the case of the English county of Cheshire, how much may be done from funds obtained in this way; the whole of the rates of that county, and the cost of the magnificent bridge and spacious courts of justice at Chester, having been defrayed out of the profits arising from the river Weaver navigation (sometimes facetiously called *Miss Weaver, the Cheshire heiress*), and this is but a sample of what every Irish county possessed of a proprietary interest in railways might reasonably anticipate for itself in course of time. Secondly, the execution of the railway would give employment for several years to many thousands of the present starving poor of the sister kingdom, and reduce in a corresponding

degree the poor-rates to which Ireland as well as England is now subject. And, thirdly, the counties will immediately secure for themselves, at an exceedingly small risk, all the inestimable advantages of the railway system; while, if the present plan be rejected, they may have many long years to wait for so desirable a consummation.

It is not proposed that *all* the counties of Ireland shall become bound for the four per cent. interest, nor any but such as are actually intersected by the railways to be executed; neither will those liable to be rated to make it good be assessed equally, but in proportion only as they are respectively benefited.

The works are to be executed by commissioners to be appointed by Government; subject to a Board of Control, consisting of gentlemen of rank, station, and influence, belonging to or officially connected with the counties intersected.

Each railway is to be the subject of a separate and distinct subscription; and the subscribers to each are to form a corporation, and to be represented by a board of directors.

The first which it is proposed to make is the great southern trunk line, recommended by the Railway Commissioners in 1838-9, commencing at Dublin, and proceeding by way of Holycross to Limerick and Cork. And this line is to be divided into two sections—the Dublin and Limerick and Limerick and Cork—to be executed, the one after the other. The estimated cost of the former section is £1,300,000; and small as the commissioners' estimate of the traffic upon it is, should the actual traffic not fall below it, that will yield on the required capital a net profit of full 7 per cent.

The capitalists, by whom the present plan is promoted, have engaged with the Government to deposit at once the £1,300,000 required for the Dublin and Limerick line, on the understanding that an act for it shall be allowed to pass during the present session.

The land required for each railway is to be vested in the company of subscribers to it; and the commissioners are to be empowered to settle and adjudicate in all cases of disputed value. It is but fair to the Irish landowners to state, that in the few cases that have hitherto come before them, they have shown a much more commendable spirit, in this respect, than too many of their English brethren. In the instance of the Dublin and Kilkenny project—in which there was, perhaps, less reason for forbearance than in many others—the landowners, we understand, met the directors with a most amicable feeling, and in the course of a few weeks arrangements were voluntarily and cheerfully entered into which in this country would have required the interposition of some forty or fifty sheriffs' juries.

The merit of devising the plan, the leading features of which we have now presented to our readers, and of advancing it so far towards a happy accomplishment, is chiefly due, we believe, to Mr. Charles Vignoles, C. E., whose valuable contributions to the Reports of the Irish Railway Commissioners in 1838-9 must be in the recollection of all who have taken any interest in this important subject.

RAILWAYS IN GERMANY.

(*From the Railway Magazine.*)

LEIPSIC AND DRESDEN RAILWAY.

The permission for the establishment of this important line of internal communication in the heart of Germany, was granted by a royal decree of the 6th of May, 1835. It authorised the formation of a joint-stock company, under the name of the "Leipsic and Dresden Railway Company," with a sufficient capital to carry into execution the great work, for which plans and preparations had already been made by a committee, formed in 1834. In this decree, the relation between the railway company, and the post department, which, in consequence of conflicting interests, has to be seriously regarded in every undertaking of this kind on the continent, has been defined, and regulated as follows; viz.—

The Railway Company has to forward for the post department all letters, newspapers, &c., without charge. All monies, and packages upwards of 20 lbs. of weight, (which can only be forwarded by mail) will be carried over the railway at 25 per cent. below the usual charge for freight, in separate cars, under the charge of a mail conductor. For the right to carry passengers over the railway, the company has to pay an equivalent to the loss sustained thereby by the post department, to whom, hitherto, the exclusive right of forwarding persons *regularly* was granted. The amount so to be paid will be, during the first three years of operations, £1,429 annually, and should, after this time, the dividend on the shares, or the net profit, amount to $4\frac{1}{2}$ per cent., the compensation will be increased to £1,714, and if the dividend should amount to 5 per cent., to £2,143. The post department may avail itself of every trip upon the railway to forward its letters and packages, and will also be consulted as to the time of starting trains from each end of the line.

To fix the tariff for passengers and freight was left entirely to the directors of the company, and the only limit put in this regard was, that the passenger fare shall not exceed that paid in royal diligences and mail coaches for equal distances; and that the charges for freight shall never be higher than those allowed to common forwarders, upon the turnpike-roads, under similar circumstances. For the period of three years, the transportation of the salt for account of the government, between Leipsic and Dresden, was let to the railway company, at the price paid for it by the administration in 1834. Finally, the company was allowed to issue and circulate bank notes to the amount of £71,430 (500,000 thaler), with the obligation to redeem the same on presentation.

The capital stock of £214,286 (1,500,000 thaler) was subscribed, and the first meeting of the stockholders took place on the 5th of June, 1835. Before determining definitively upon the line and profile of the railway, the directors consulted the opinion of James Walker, Esq., civil engineer, from England, in consequence of which the maximum inclination was fixed at 26.4 feet per mile, and the maximum radius of curvature at 3,710 feet. Captain Kunz, director of hydraulic works in the government service, was appointed chief engineer. The construction of the railway was commenced on the 29th of February, 1836, on the division between Leipsic and Wurtzen, and the section from Leipsic to Althen, of six miles in length, opened on the 24th of April, 1837.

At the meeting of the stockholders, held on the 15th of June, 1837, the directors presented the estimate of the cost of the whole railway, amounting to £626,567. The original estimate of the probable cost of the work, made by the committee in 1835, upon which the amount of the capital stock was founded, presented the sum of only £258,427. In order to supply this great deficiency in the capital, it was resolved to increase the stock to £642,857 (4,500,000 thaler), or three times its original amount, in the following manner:—"When the stockholders will pay their 9th instalment of 10 thaler on the original 15,000 shares, for which they are in possession of as many interim notes, they will deliver the latter and receive in exchange three times as many certificates, upon each of which the receipt of 30 thaler, instead of 90, will be noted. Each stockholder thereby comes in possession of three times the number of shares for which he subscribed, and after having paid 90 thaler instead of paying only 10 thaler more as his last instalment, he will have to pay 3 times 70 thaler, or 210 thaler (£30)." This financial expedient had the fullest success, and in consequence of this arrangement the resources of the company are at present—

	Thaler.		£
Capital Stock paid in	4,500,000	or	642,857
Amount issued in bank notes redeemable on demand..	500,000	or	71,430
Loan made by the company in 1839, for laying down a second track, and building their part of the Magdeburgh and Leipsic Railway to the frontier of Prussia	1,000,000	or	142,857
Total	6,000,000	or	857,144

In the measure as the works progressed, different sections were put into operation during the year 1838, as well from Leipsic as from Dresden, and the opening of the whole line finally took place on the 7th of April, 1839.

The railway commences at Leipsic, passes Wurtzen, Dahlen, Oshatz, crosses the river Elbe at Riesa, and, continuing on its right side, reaches Dresden. The location of the line was made partly with a view of connecting the same with a railway from Berlin to Saxony, which was to terminate at Riesa. The whole length of the line, from Leipsic to Dresden, is $71\frac{1}{3}$ miles, of which $20\frac{1}{3}$ miles are horizontal, and the remainder, 51 miles, rising and falling alternately with different inclinations, the maximum of which, 26·4 feet per mile, has been introduced on a distance of twenty miles. On the whole length there are:—

1.2 miles of bridges; 9.5 of grading level with the adjoining ground; 40.8 of embankments from 2 to 36 feet in height; 19.8 of excavations from 2 to 52 feet in depth; total 71.3 miles.

The country through which the railway passes, being much broken and undulating, very heavy works had to be executed, in order that a line and profile, as favourable as they were proposed by Mr. James Walker, might be obtained. The whole mass of earth moved, amounted to 134 millions of cubic feet. The railway crosses 11 times the state roads; 4 crossings are level with 6 over, and 1 under the turnpikes; besides, it crosses 167 other roads, for which 72 bridges were constructed. 24 bridges were erected over rivers and streams, the most important of which are:—

	Length in feet.	Cost. £
The bridge over the Mulde at Wurtzen..........................	1,460	17,857
The viaduct over the valley of the Döllnitz, near Oshatz..........	1,546	9,000
The bridge over the Elbe near Riesa	1,302	38,143
The viaduct near Roderau........	2,480	11,143

The whole number of bridges is therefore 102, besides, there were made 295 stone culverts from $1\frac{1}{2}$ to 4 feet in width.

The tunnel near Oberau, 11 miles from Dresden, has a length of 564 feet; its inner height is 20 feet in the clear, its width at the bottom $22\frac{1}{4}$ feet, and, $7\frac{1}{2}$ feet above the bottom, $24\frac{1}{2}$ feet; it contains 313,000 cubic feet of masonry, exclusive of the two entrances, and has cost £50,000.

Different methods were introduced for making the superstructure of the railway. The first, which has been adopted for the greatest part of the division between Leipsic and Wurtzen, was after the American principle, and consisted in plate rails of $2\frac{1}{2}$ by 1, weighing 25lbs. per yard, fastened at the ends by means of screw bolts, and in the middle with common spikes, upon longitudinal bearing timbers, 6 by 7, which were made fast into cross ties laid upon the ground 3 feet apart from centre to centre. The timber used was oak. As this kind of superstructure was afterwards thought too weak for the great traffic expected upon the line, the massive rail was adopted, and a second part of the railway finished with an edge rail of 45lbs. per yard, resting in chains every three feet upon cross ties of half trees, which were laid upon a bed of gravel 8 to 12 inches high. The superstructure of the third kind consists in a rail of the inverted T pattern, weighing 50lbs. per yard, supported by cross ties, which rest two feet apart upon a bed of gravel;

aud finally, as the fourth method, the bridge-rail, as employed upon the Great Western Railway in England, of 50lbs. per yard, has been tried on a part of the second track.

The principal stations, at Leipsic and Dresden, contain the necessary buildings for tho accommodation of passengers and the officers of the railway, as also the warehouses for the reception of goods. The priucipal machine shop is in Leipsic, aud there are also repairing shops at Dresden. Intermediate stations are at

Wurtzen	15 miles from Leipsic.		
Dahlen	$26\frac{1}{2}$	"	do
Oshatz	32	"	do
Riesa	$41\frac{1}{2}$	"	do
Priestewitz	53	"	do
Niederan	62	"	do

At Riesa 12 coke-ovens were erected for the use of the railway; the coke is made of coal, procured from England, and costs the company about 3s. per cwt.

PATENTS.–BRITISH AND FOREIGN.

ENGLISH EXPIRED PATENTS.

Marson William Lawrence, of Goodman's-fields, *improvements in refining sugar*, April 28.

Joseph Anthony Berrollas, of Lambeth, *a detached alarum watch*, April 28.

Robert Dawes, of Margaret-street, Cavendish-square, *improvements in easy chairs*, April 28.

Thomas Breidenbach, of Birmingham, *improvements in bedsteads*, April 28.

Dr. Benjamin Somers, of Langford, Somersetshire, *improvements in furnaces for smelting*, April 28.

William Lockyer, of Bath, *improvements in the manufacture of brushes*, April 28.

Henry Knight, of Birmingham, *a machine to ascertain the attendance of watchmen, workmen, &c., on duty*, April 28.

John M'Curdy, Esq., of the Strand, *improvements in rectifying spirits*, April 28.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 277.)

Herman Schroder, of Mark-lane, London, broker, for *improvements in filters* (being partly a communication), May 2.—This invention relates to what are called bag filters, which are used principally for filtering the syrups of sugar; and the object of this invention is to obtain a very extensive surface of fabric as a filtering medium in a given space, and yet offering great convenience for cleansing.

Claim first.—The mode of employing frames and bags, herein described.

In constructing these filters a series of bags are employed, which may be either plain or plaited, and into the mouth of each bag is inserted a frame, provided with suitable openings for the passage of the syrup (or other article to be filtered) into the bag. The bags are placed within a box or chamber, provided with a perforated false bottom, on which the bottoms of the bags rest, their mouths with the frames being near the top of the box, and secured in their places by a wedge. The syrup is poured into the upper part of the box above the frames, and runs through the openings of the same into the bags, through which it filters, and is drawn off by a cock at the bottom of the box.

Claim second.—The mode of constructing and applying filter bags, as herein described.

This part of the improvements consists in attaching a number of small bags to the bottom of a large filter bag, in such manner that when they are drawn through the large bag, and the same is turned inside out, in order to cleanse it, they appear like so many pockets attached to the bag; but when fit for filtering they are within the large bag, their mouths opening downwards towards the bottom of the box, and are kept properly stretched by means of strings fastened at their other ends, which are tied to loops on the sides of the large bag.

Claim third.—The mode of constructing and applying filter bags by drawing each bag within itself.

This part consists in merely drawing the bag once or twice within itself, and suspending those folds by loops and strings, so as to expose a larger surface of fabric for filtering.

Claim fourth.—The mode of combining bag-filters herein described.

This last part of the improvements consists in the employment of a number of small filter bags within an outer bag, the small bags being closed at all parts with the exception of an opening at the bottom of each, which is connected by a nozzle or short pipe with a corresponding opening in the outer bag, in order to permit the liquid that filters through the small bags to run into the bottom of the box.

James Heywood Whitehead, of the Royal George Mills, near Saddleworth, Yorkshire, manufacturer, for *improvements in the manufacture of woollen belts, bands, and driving straps*, May 2.—This invention consists in applying a composition to a woollen belt to give it firmness and adhesiveness, as a substitute for leather for driving machinery.

The composition consists of linseed oil and resin mixed together, in the proportion of three pounds of linseed oil to two pounds of resin; but these proportions may be varied a little to suit circumstances. The oil is first boiled, and the resin in fine powder added to it while it is in the boiling state, being well stirred till they are thoroughly mixed together.

The belt or strap is passed through the mixture and between two rollers, which are weighted sufficiently to make the composition even, so that it will not run out of the cloth when hung up. The cloth is then well stretched in length and dried, after which it is ready for use.

James Boydell, jun., of Cheltenham, ironmaster, for *improvements in working railway and other carriages, in order to stop them, and also to prevent their running off the rails*, May 2.—Claim first.—The mode of applying apparatus acting by lever pressure on rails, as a means of stopping carriages, as herein described.

Beneath the lower part of the railway carriage a projection is affixed, carrying the axis of a lever, the lower end of which lever is enlarged and embraces the rail, the part which comes against the rail being lined with wood, to enable it to offer greater friction. This part of the lever is, by means of another lever, and connecting links, brought in contact with the rail, whenever it is desired to stop the train.

Claim second.—The mode of applying bars to prevent carriages running off the rails of railways.

Beneath each carriage are two bars, which extend across from opposite corners of the framing of the same, crossing each other beneath the centre of the framing, aud from which centre they are suspended by means of a pin passing through a slot formed in the centre of each bar. The ends of the bars are connected by pins to the ends of the bars of the carriages before and behind them, thus forming a continuous bar, which will in most cases prevent the carriages from getting off the rails, and in case one of the carriages should run off the rails will prevent it from running at any considerable angle to the same. The slots in the bars have sufficient play to permit the train to move over curves easily.

Josiah Pumphrey, New-town-row, Birmingham, brass-founder, for *certain improvements in machinery to be employed in the manufacture of wire hooks and eyes*, May 2.—Claim.—The application or employment of the machinery herein described in the flattening and planishing of wire hooks and eyes and other articles.

Instead of tho ordinary mode of flattening and polishing (commonly called planishing) wire hooks and eyes, the patentee employs for those purposes the machinery herein described. This machinery consists of two dies, one of which is firmly imbedded in the machine; the other is fixed to a bolt or ram, working in guides, and is made alternately to approach and recede from the fixed die, by the revolution of an eccentric wheel or cam, mounted on a horizontal axis, which is turned by steam or other power. The partially-formed hooks and eyes or other articles are placed upon the lower or fixed die, and the upper die descending thereon effects the flattening and planishing process.

Henry Wimshurst, of Limehouse, Middlesex, shipbuilder, for *improvements in steam-vessels, in communicating power to propellers of steam-vessels, and in shipping and unshipping propellers*, May 2.—These improvements are applied to those steam-vessels that are provided with screw propellers.

Claim first.—The mode of applying a body post, herein described.

This part of the improvements consists in applying a main body post in one or more pieces, and a lower buttock, to that part of the vessel in which the screw propellers revolve, in order to obtain greater strength and stability.

Claim second.—The mode of communicating power, by the combined means of cog-wheels and bands or straps to propellers.

The shaft of the propellers is connected by means of a coupling-box with one end of a horizontal shaft, on the other end of which is fastened a cog-wheel. This cog-wheel is caused to revolve by means of two other cog-wheels turned by a steam-engine or other prime mover. Motion is likewise communicated to the horizontal shaft by means of endless bands or straps, which pass round a drum fixed on this shaft, and round a drum on the axis of each of the two cog-wheels. The shaft of the propellers can at any time bo disengaged from the horizontal shaft by means of the coupling-box.

Claim third.—The mode of shipping and unshipping propellers.

The shaft of the propellers has its bearings in two angular stems or bars, on the lower ends of each of which is a projection or stud, which enters a recess formed in the metal braces that combine the body post with the keel and stern post. The upper end of each bar or stem passes through the trunks, where they are secured from movement when in use, but when it is desired to unship tho propellers, then the stems are raised by suitable tackle, till the studs at their lower ends are lifted out of the recesses; other tackle having been first applied to the shaft of the propellers, by means of which they are drawn from under the vessel as the stems are lowered down the trunks.

John Edward Orange, of Lincoln's-inn, Old-square, Middlesex, Captain in the 81st Regiment, for *improvements in apparatus for serving ropes and cables with yarn*, May 2.—This invention is an improvement in the serving-mallet, and consists in so arranging the apparatus connected therewith, that a serving-mallet constructed according to this plan will be rendered suitable for serving ropes or cables with yarn, and at the same time will carry a supply of yarn; thus dispensing with the necessity of a second person (heretofore required) to hand the yarn round the rope, during the using of a serving-mallet of the ordinary construction.

To the upper part of the serving-mallet is attached a yarn-holder, which consists of a spherical vessel of copper. The upper part of it is capable of opening on a hinge, in order to admit a ball of yarn, and is retained when closed by a catch and wedge; the yarn passes out of the yarn-holder through an opening in its under part, thence under a friction crank on the side of the mallet, by means of which any required degree of resistance to the passage of the yarn may be obtained. The yarn is then passed once or twice round the serving-mallet before serving the rope or cable.

Claim.—The mode of combining serving-mallets with apparatus for holding yarn, and governing its winding on a rope or cable, as described.

Elijah Galloway, of Manchester-street, Gray's-inn-road, Middlesex, engineer, for *improvements in propelling railway carriages*, May 2.—Claim.—The

mode of propelling carriages on railroads by the application of a moving rail or bar, acting against a wheel or wheels, of different diameters to the other wheels of the carriage, by which means carriages can be propelled on railways at a much greater velocity than the speed of the moving or propelling rail or bar.

On the centre of the axis of each pair of running wheels is fastened a double-flanged wheel of smaller diameter than the running wheels; and in contact with this wheel is a moving rail, placed in the centre of the line of railroad, and supported by anti-friction rollers; this rail being set in motion by a stationary steam-engine or other prime mover propels the carriages along.

JOHN DUNCAN, of Great George-street, Westminster, gent., for *improvements in machinery for cutting, reaping, or severing grass, grain, corn, or other like growing plants or herbs*, May 2.—Claim.—The combination of the fixed projecting fingers with the revolving cutters, and also the combination of the frustrum with the revolving and stationary guides, by which the crop, when cut, is confined to and discharged from it.

In front of the machine on the right hand side of the shafts is a conical frustrum, on the base of which is a circular cutting-plate, and affixed to this plate are several cutting instruments, formed like the points of scythes; below these are projecting fingers, extending out from the bottom framing of the machine, which gather the corn together, and hold it firmly to the action of the cutters. The frustrum being turned by gearing from one of the running wheels of the machine, the cutters will cut the corn or other grain, which as it is cut revolves with the frustrum, and is confined to the surface thereof by bent rods, affixed to two flanches, which being caused to revolve assist in carrying the corn round to the body of the machine, where it is caught by guides, and suffered to accumulate.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 10th of July.

John Buchanan, of the city of Glasgow, Scotland, builder, due June 28.

William Bridges Adams, gent., of Porchester-terrace, Middlesex, due June 28.

John Wells, gent., of Ely-place, Hammersmith, Middlesex, due June 30.

William Henry Kempton, gent., of the City-road, Middlesex, due June 30.

Henry Adcock, of Winstanley, near Wigan, Lancaster, civil engineer, due June 30.

Francis Burdett Whitaker, of Royton, Lancaster, cotton-spinner, due June 30.

Joseph Stubbs, of Warrington, Lancaster, file-manufacturer, due June 30.

Thomas Robert Sewell, of Carrington, Nottingham, lace-manufacturer, due June 30.

William Henry Kempton, of Pentonville, Middlesex, gent., due June 30.

John Grylls, of Portsea, due June 30.

Joseph Haley, of Manchester, engineer, due June 30.

William Newton, of Chancery-lane, civil-engineer, due June 30.

Henry Scott, of Brownlow-street, Bedford-row, Middlesex, surgeon, due June 30.

William Hensman, of Woburn, Bedford, machinist, due June 30.

Joseph Parkes, of Birmingham, button-manufacturer, due June 30.

Louis Holbeck, gent., of Hammersmith, Middlesex, due June 30.

Charles Golightly, gent., of Gravel-lane, Southwark, due July 4.

George Child, of Lower Thames-street, merchant, due July 4.

FOREIGN PATENTS.—BELGIUM.

LIST OF PATENTS RECENTLY GRANTED BY THE BELGIAN GOVERNMENT.

(*Continued from page* 215.)

J. F. Devolder, a patent of addition for 5 years, to date from May 16, 1840, for *additions to the economical store* (for which he obtained a patent May 16, 1840), Feb. 26, 1841.

Pierre Kopezynski, a patent of improvement and addition for 15 years, to date from Sept. 30, 1839, for *improvements and additions to the Swedish stove*, (for which he obtained a patent Sept. 30, 1836), Feb. 26, 1841.

William Carpmael, represented by Dixon, a patent of importation for 5 years, for *improvements in ploughs and other agricultural implements*, Feb. 26, 1841.

A. Cornez and Co., a patent of importation for 5 years, for *a condenser applicable to steam-engines, working in vacuum with a minimum of cold water and waste of power*, Feb. 26, 1841.

Maximilien Mezanguel, a patent of invention for 10 years, for *an apparatus called parachute, for preventing accidents consequent on the breaking of axletrees*, Feb. 28, 1841.

L. H. F. Jouve, a patent of invention for 15 years, for *an accelerated circular frame called by the inventor Accelerated Belgian Knitter*, Feb. 28, 1841.

Antoine Alexandre Froëlich, a patent of invention for 15 years, for *a mechanical process for ramming the various pyrotechnic elements composing fire-works*, Feb. 28, 1841.

W. R. Burnett, represented by Pierrard and Ellis, a patent of improvement for 15 years, for *improvements in machines for cutting and working wood* (for which he obtained a patent Dec. 10, 1839), Feb. 28, 1841.

Auguste Guillaume, a patent of importation and improvement for 5 years, for *a new economical process for fining cast-iron in order to reduce it to wrought, rolled, or cast-iron of commerce, &c*, Feb. 28, 1841.

Albert Hartmann, represented by Huart, a patent of importation for 5 years, for *an apparatus for folding cloth and other stuffs*, Feb. 28, 1841.

George Barnett, represented by Dethy, a patent of invention for 5 years, for *improvements in various fastenings of dress*, March 7, 1841.

Auguste Vandivoet, a patent of importation and improvement for 5 years, for *the manufacture from limestone or plaster of compounds analogous to hydraulic lime or natural cement*, March 7, 1841.

J. Bennett, sen, represented by Dethy, a patent of invention for 10 years, for *improvements in machines for cutting, tearing, or unravelling rags, cordage, hay, straw, and other soft and fibrous substances*, March 16, 1841.

John Davies, of London, represented by Dethy, a patent of invention for 10 years, for *certain improvements in the form and combination of blocks for building houses, paving streets, roads, &c. &c.*, March 16, 1841.

M. D. Henvaux and E. Demanet, a patent of invention for 15 years, for *a process of ascending and descending inclined planes on railroads without the aid of fixed steam engines*, March 16, 1841.

E. Demanet and M. D. Henvaux, a patent of improvement for 15 years, for *improvements on a locomotive for the purpose of ascending and descending inclined planes on railroads without the aid of fixed engines*, March 16, 1841.

Marcus Berlé, represented by Stoclet, a patent of importation and improvement for 5 years, for *a new kind of lamp for burning oil without smoke or smell, and with the increase of flame and light*, March 16, 1841.

John Swain Worth, of Manchester, represented by Baert, a patent of importation and improvement for 5 years, for *an improved temple adapted to weaving, for the purpose of spreading the stuff as it is made*, March 16, 1841.

N. Lievin-Bauwens and F. Lievin-Bauwens, a patent of invention for 15 years, for *a rotary steam-engine*, March 20, 1841.

F. G. Coutelle, a patent of invention for 10 years, for *an apparatus for the purpose of repairing brass wire cloth used in manufacturing paper*, March 20, 1841.

Alphonse Bodart, a patent of invention for 15 years, for *a new apparatus for manufacturing gas-light from fat and resinous substances combined with coal*, March 20, 1841.

N. L. Hais and J. H. M. Ottmans, a patent of invention and improvement for 15 years, for *a new method of teaching to write, reduced to the greatest simplicity*, March 20, 1841.

J. B. Favre, represented by Vergote, a patent of importation for 5 years, for *two hydraulic machines, one for the purpose of raising water from story to story, and the other for raising water to any intermediate height, without intermediate stories*, March 20, 1841.

William Wright, of Manchester, represented by Urling, a patent of importation for 5 years, for *a new apparatus for transmitting drawings and other objects of nature and art to metallic surfaces, prepared by a new process*, March 20, 1841.

Pierre Antoine Brun, of Paris, represented by Doré, a patent of importation for 5 years, for *a new kind of continuous lever jack for setting up the shrouds, &c.; applicable to other purposes*, March 20, 1841.

François Poney, of London, represented by Dethy, a patent of importation for 5 years, for *improvements in chronometers*, March 24, 1841.

Abraham Dixon, a patent of importation for 5 years, for *improvements in lamps*, March 24, 1841.

E. Sacré, a patent of invention for 10 years, for *a temple for spreading cloth in weaving looms*, March 25, 1841.

Ed. de Rottermund, a patent of invention for 15 years, for *a process of cleaning types and engravings*, March 25, 1841.

William Nicholson, of Manchester, represented by Urling, a patent of importation for 5 years, for *improvements in carriages for conveying travellers on railroads, and for new seats for these and other carriages*, March 25, 1841.

Antoine Biondetti, a patent of invention for 10 years, for *an apparatus for curing club feet, and for straightening the bone of the leg*, March 29, 1841.

Charles Speelman, a patent of invention for 10 years, for *a process of making wine vinegar by means of beet-root*, March 29, 1841.

Joseph Auguste Odeyn, a patent of invention for 15 years, to date from June 10, 1840, for *additions to the mechanical method of teaching to write* (for which he obtained a patent June 10, 1840), March 29, 1841.

Norbert Lamal, a patent of improvement for 10 years, to date from November 9, 1839, for *new improvements on the improved English stove* (for which he obtained a patent Nov. 2, 1839,) March 29, 1841.

Louis Josse Goens, a patent of improvement for 15 years, to date from January 12, 1840, for *improvements in the plan of manufacturing flat wire cords*, March 29, 1841.

A. Dathis and L. Het, a patent of improvement for 10 years, to date from March 18, 1839, for *improvements in the plan of wood pavement combined with asphalte* (for which Het and Bon obtained a patent March 18, 1839), March 31, 1841.

William Hopkin, of Lille, represented by Dethy, a patent of importation for 5 years, for *applying t*

looms metallic or other plates to be attached to the verge, and for preventing the wear of these threads by change of position, March 31, 1841.

FOREIGN INTELLIGENCE.

BELGIUM.

IRON STEAM-BOATS ON THE MEUSE.

Le Progrès, the first iron boat built in the ship-yards of Messrs Orban and Petry-Driannc at Grivegnée, has just beeu launched; although 42 tons measurement, it only draws when empty twelve centimetres of water. This method of construction unites two great advantages, solidity and lightness. Thus the difficulty of steam navigation on the Meuse attempted so unsuccessfully by Mr. Cockerill with heavy wooden boats and heavy engines of low pressure, is going to be removed by the iron boats of M. Orban, provided with a light engine of high pressare, executed by Messrs. Houget and Teston of Verviers. The boiler, resembling that of the locomotives in every respect, may be considered as unoxplodable, in consequence of the precaution that has been taken to join to it a small machine which keeps the water at the same height in the boiler, even while the vessel is at quay and not at work. The Minister raised a singular objection to this boat; he pretended that accordiug to a former decree of King William, prohibiting high-pressure engines, this boat should be prevented from navigating; but the constructors replied by alluding to the hundred and twenty locomotives on the railway, the boilers of which they only imitated, and to the numerous steam-vessels worked by high-pressure steam which navigate the Rhine, the Danube, and the sea.

COAL-MINE EXPLOSION.

A fatal explosion of carburetted hydrogen gas occurred on the morning of the 29th ult., in the coal mines at Ougrée. The men were at work at the time, and twenty-seven of them were killed. As soon as the explosion took place the director of the works and the chief engineer descended the shaft, and at the risk of their lives entered the gallery where the explosion had taken place. They soon came to three men, one of whom was still alive, but he expired a few hours after he had been taken to the top of the shaft. The other twenty-four men, who were subsequently found, were all dead. Numbers of men were at work in other parts of the mine at the time, who escaped injury. The exact cause of the accident is unknown. The ventilation was supposed to be perfect and the workings in the best condition. The superintendence of the works was most vigilant, and all the best-approved systems of ventilation were adopted. This accident, which occurred so shortly after the still more fatal one at the Willington colliery, near Newcastle, affords another instance of the insecurity of trusting to ventilatiou alone as the means of safety. The constant use of the safety lamps should be enforced even in the best ventilated pits, as unforeseen accidents are always liable to occur. By these two calamities sixty-one lives have been lost within a week by coal-pit explosions. Had a similar loss of life occurred within the same space of time on railroads, it would have raised an alarm and outcry that would have compelled the adoption of immediate measures for the avoidance of danger.

DISMISSAL OF ENGLISH WORKMEN.

It is stated in the *Memorial de la Sambre*, under date of Charleroi, 20th April, that the Joint Stock Company for working the blast furnaces and manufactures at Couillet, are on the point of dismissing all the English workmen employed in their workshops. This measure is attributed to the high salaries which were granted them, and to the superiority of the workmen of the country. Thus the English workmen after having been induced to leave their country under promise of high wages, when they have shown the foreigners their modes of working, are sent home, as too expensive an incumbrance.

The Providence Society has just decided that a blast furnace shall be added to the rolling-mill which belongs to it; the commencement of the works will take place in a short time. The various manufacturers in the district of Charleroi make use of 187 steam-engines of an average power of 50 horses each, altogether equal to the power of 9,350 horses. All these engines, with two or three exceptions, have been constructed in the manufactories of the country.

M. Botturi, who claims to be the original iuventor of felted cloth, has established a small manufactory at Brussels for carrying on his processes ou a small scale. The *Fanal*, which has on several occasions advocated his claims, and dwelt upon the injustice he has experienced, appeals to capitalists to join Botturi to enable him to carry on his operations on a large scale. He does not confine his process to the mere manufacture of the cloth, but it extends to making it in the form in which it is to be worn. He manufactures felted coats of the regular shape, without seam; he also makes gloves, shoes, boots, and a number of other articles in felted cloth, all without seam, and produced from the first in the forms required.

A large saw mill, worked by a steam-engine of fifty-horse power, has been lately erected in Brussels, and in connection with this establishment is a wood-paving company. The plan of wood-paving adopted consists of cubes of wood prepared with asphalte, so as to render it more durable and hard, and less slippery. It is stated that the sawyers endeavour to raise a prejudice against the saw mill by affirming that wood sawed by hand is much more durable than when sawed by machinery.

The *Fanal* mentions the invention of a new musical instrument by M. Sax, which promises to satisfy with its volume of sound the most noise-loving of musical ears. It is described to be a contre-bass clarionet made of copper. The *Fanal* says, "we have heard it, and we can affirm, that, after thunder, it is the most powerful bass that exists. Its round, full vibrating sounds completely fill the ear, and satisfy the most gluttonous musical appetite. It is a river of harmony overflowing its banks. The *Saxophone* is the Niagara of sound."

GERMANY.

COMMERCIAL TREATY BETWEEN ENGLAND AND THE PRUSSIAN LEAGUE.

The Hamburgh correspondent of the *Morning Chronicle*, writing on the 30th of April, makes the following remarks on the important commercial treaty which has recently been signed between this country and the states of Germany, comprising what is termed the Prussian league.

"The recent commercial treaty between Great Britain and the Prussian league, coupled with the modification of the navigation laws conceded by Great Britain to Hamburgh, have giveu general satisfaction here, and the measure cannot but have a favorable operation upon the commerce of the Elbe. The treaty between Great Britain and Prussia on behalf of the league (signed in London on the 2d of March last, but not yet ratified), stipulates that ships belonging to Prussia and the states of the league, not being laden with prohibited goods, and coming from the mouths of the Meuse, the Ems, the Weser, and the Elbe, or any other river between the Elbe and the Meuse connecting the German states with the sea, shall be admitted into British possessions with all the facilities and advantages granted to vessels sailing from Prussian ports. The shipping of the Prussian league is thus placed on the same footing as Austrian ships by the late treaty, which allows such ships to convey Austrian produce from ports on the Danube, though the port of export should not be Austrian. By the act 3 and 4 Vic., cap. 95, the Queen in council is empowered to apply the principle of the Austrian treaty to other countries as circumstances may require, and that the present instance is a judicious application of it can hardly be doubted. Whether it may ultimately be practicable for England, by concessions on her own part as regards her corn and timber duties, to effect a reduction in her favor of tho Prussian tariff, is not now the question. The object is, in existing circumstances, to promote, as much as possible, British commercial intercourse with the league,—to do all that can be done to attract its shipping to our ports. In the opinions of some, the Scheldt should have been included; but the Scheldt is wholly a French aud Belgian river, and though an indirect medium of communication with Germany, has certainly far less claim to the designation of a German river than the Meuse, or any of the others named. By the same treaty, the Prussian league engages to place British commerce on the footing of the most favored nation, as regards the importation of rice and sugar. An express stipulation on this point was required, because, although the present Prussian tariff has made a general reduction in the sugar and rice duties imposed by the former tariff, yet it is provided that concessions shall be required from those nations which are allowed to import those articles at the low duties. Refined sugar will thus be admissible at ten Prussian dollars the quintal, raw and lump sugar at five dollars, and rice at two dollars the quintal.

"A supplementary treaty has also been concluded between Great Britain and Hamburgh, calculated to facilitate the commercial operations of the league, as well as to beuefit the trade of the Hans Towns, whereby the navigation laws are so far relaxed as to permit the importation of European produce into the British colonies, in ships belonging to the port of export. As the navigation laws stood, Hamburgh ships could only import into the British colonies articles which were the produce or manufacture of the Hans Towns, that is to say, nothing, or next to nothing. But by allowing goods to be imported in ships of the port of export, a material alteration is made in favor of the shipping of the Hans Towns. It would seem, however, that the shipping interests of Hamburgh, Bremen, and Lubec are those which will principally benefit by the treaty, since it has always been in the power of the merchants of those places to take up at reasonable rates ships of the country producing or manufacturing the goods. For instance, if Hanoverian or Danish produce were to be exported to the British colonies, the Hamburgh merchant had no difficulty in despatching it from the Elbe in Hanoverian or Danish ships. Now he will have a further range of choice from the shipping of his own city; which is undoubtedly right in principle, though the practical advantages may not at first be so great as some anticipate."

RAILWAY INTELLIGENCE, DOMESTIC AND FOREIGN.

A deputation from a great number of railway companies waited on the Chancellor of the Exchequer on Saturday in Downiug-street, to procure an alteration iu the mode of levying the railway passenger tax. The deputation was supported by the following Members of Parliament:—Mr. Loch, Mr. Chalmers, Mr. Bell, Mr. R. Steuart, Sir Hesketh Fleetwood, Mr. Hodgson Hiude, Mr. Broadley, Mr. Wallace, Mr. Oswald, Lord James Stuart, Sir Henry Parnell, Sir William Rae, Mr. Hastie, Mr. Houston, Mr. George Wilbraham, Mr. Dennistoun, and Mr. Lockhart.

London and Brighton Railway.—It has been decided by the directors of the London and Brighton Railway to open twenty miles of that line from London to Hayward's Heath, in June. The whole work will be completed and opened to the public in August.

Birmingham and Gloucester Railway.—A special meeting of the proprietors was held on Tuesday

at Birmingham, Captain C. R. Moorsom, R. N., in the chair. The meeting was summoned to consider the most desirable mode of raising an additional capital, the funds at the disposal of the directors not being adequate to the necessary expenditure. A plan was resolved upon, by which the proprietors themselves will advance the required amount, which will ultimately be converted into £25 shares. This arrangement does not include a provision for the expenditure upon a Worcester branch, because, whenever an Act is passed for such a branch, that Act will contain powers for raising the necessary funds.

Northern and Eastern Counties Railway.—An injunction had been obtained from the Vice-Chancellor prohibiting this company from proceeding to build an intended bridge across the Hoddesdon mill-stream, which flows into the river Lea. The injunction was granted on the application of Mr. Manser, the owner of a mill on the stream, who objected that the proposed bridge would obstruct the passage of the water, and was not sufficiently high. On Saturday the counsel on behalf of the railway company moved that the injunction be dissolved, and the Vice-Chancellor on hearing the affidavits was of opinion that no injury would be done to the plaintiff by the proposed bridge, and he therefore dissolved the injunction, though without costs.

Glasgow and Greenock Railway.—The weekly return of traffic on this newly-opened line, for the week ended on Saturday last, was £804 2s. 3½d. for passengers only. No goods are carried yet, and owing to the religious scruples of the Scotch, there are no Sunday trains.

A Chace on a Railway.—On Thursday last, a person named George Comley (having with him his wife and six children) took places for himself and family by the eleven o'clock railway train from Gloucester to Birmingham. Soon after the train had started, Mr. W. Gillman, of North Nibley, arrived at the station-house, in the hope of intercepting Mr. Comley, who, he stated, had executed a forgery upon him to the amount of £40, and had also committed other frauds, and was then *en route* for Liverpool, where it was understood he had engaged a passage for America. After a short consultation with Mr. Walker, police-superintendent, a pursuit was resolved upon, and for a payment of £10, an engine was immediately got ready, with which Mr. Gillman and Mr. Walker started, at high pressure speed, in the hope of overtaking the train, which by that time had had the advantage of about twenty minutes' start. After a fine chace, they succeeded in getting sight of the train at Ashchurch, and followed close in its wake to the Spetchly station, where, much to the surprise and consternation of the fugitive, his pursuers came up with him, and sadly deranged the plans he had so cleverly laid for his escape.—*Gloucester Journal.*

RAILWAY ACCIDENTS.

A Guard Killed on the Birmingham and Gloucester Railway.—On Thursday evening, as the six o'clock train was proceeding along in the neighbourhood of Eckingtun station, a guard, named James Dudley, in endeavoring to shift his position from one carriage to another, missed his hold, and fell under the wheels, which passed over his breast. He died immediately.—*Worcester Journal.*

Fatal Railway Accident.—On Tuesday morning a fatal accident happened on the York and North Midland Railway, to a boiler cleaner named William Richardson. Soon after the 8 o'clock luggage train had left the terminus at York, the deceased was observed running ahead of the carriages at the top of his speed. On the train passing him he made a spring to get on to one of them, but unfortunately missed his hold and fell between the rails, and the whole of the carriages passed over his body. The engine was immediately stopped, and he was picked up and conveyed to the station, where he died in an hour after.

Delay of a Mail Train.—The London mail train to Worcester, was delayed two hours and a half on Wednesday morning, in consequence of an accident which happened to the train between Droitwich and Spetchley. The engineer, perceiving that a plug connected with the machinery of the safety valve was insecure, a d dreading that the consequences might be an explosion, with considerable presence of mind he removed the fire-bars and raked out the fire.

Accidents on the Brighton Railway.—Since the 1st of January, 1841, there have been no less than 51 railway patients received into the County Hospital. Of these, 27 have been discharged cured, four have died, and one was dismissed.—*Brighton paper.*

Accident at the Works on the Brighton Railway.—A fatal accident occurred last week on the London and Brighton Railroad, near Godstone, Surrey, to two young men, about 18 years of age, who were run over by one of the trains laden with earth, &c. It appears that they were standing incautiously near the rails, and were knocked down; one of them was killed on the spot, the wheels cutting off both his feet, and passing over his body. The other boy had one of his feet severed, and lies in a hopeless state.

Accident to a Stoker.—A serious accident occurred early this morning at the Wootton Bassett station of the Great Western Railway, to an engine-stoker named Hale, who, we are informed, sustained great injury in the head by being jammed between the buffers of two engines which met before he had time to get out of the way.—*Reading Mercury.*

FOREIGN RAILWAYS.

Reduction of Fares on the Belgian Railways.—One of the last acts of the late Belgian ministry was to reduce the fares by the third-class carriages, or wagons, on the railway to the original price. The raising of the price had been found seriously to affect the number of passengers carried; for those who before were glad to avail themselves of the cheap and rapid conveyance, afterwards returned to their old habits of walking when the fares were raised. Some difference of opinion exists as to the propriety of the change, as it is asserted the fares were before as low as they could be to be remunerating. Thus passengers in the wagons, which are protected from the rain, were conveyed a distance of ninety miles for less than three shillings and four-pence. The reduction of fares which was to commence on Saturday last was also extended to the conveyance of goods.

A wagon of a new kind, being at least forty feet long and mounted on eight wheels, has just been taken to the railway station at Brussels. This carriage is calculated to hold at least 12,000 kilogrammes.

RAILWAY COMMUNICATION BETWEEN LONDON EDINBURGH, AND GLASGOW.

The fourth and final report of Lieut. Col. Sir F. Smith and Professor Barlow, the Government Commissioners appointed to determine the best line of railway communication between Edinburgh and London, has just appeared. They recommend the western line to Scotland by Lancaster, as that which best combines the threefold object of a communication between London, Edinburgh, and Glasgow; the manufacturing districts of Lancashire and the west of Scotland; and between those centres of manufacture and the north of Ireland. The commissioners in presenting this report qualify it in the following manner:—"We are led to believe, from all the information we have been enabled to, collect, that the amount of traffic, which, in the present state of the commercial and other relations of England and Scotland, may be expected between Edinburgh and Glasgow and the south, is not such as would be likely to afford an adequate return for the outlay of capital required for the construction of two distinct lines of railway, the one from Darlington to Edinburgh, and the other from Lancaster to Glasgow. Were this otherwise, we should subdivide the question into two branches, and consider, in the first instance, which of the several lines would be the most suitable for a communication by Lancaster to Glasgow, as well as to the west of Scotland, and to the north of Ireland, and which would be the best route by Newcastle to Edinburgh. Under such circumstances, we should have awarded the preference to the east coast line, whether deviated or not, between the two last-named places, and have weighed the merits of the various routes to Glasgow; but seeing the extent of capital that would be required for the construction of two distinct trunk lines, the one to Edinburgh and the other to Glasgow, we feel under the necessity of recommending, at present, the construction of one line only; and, after a careful review of all the circumstances of this important question, we give the preference to the line from Carlisle by Lockerby, Beattock, Lanark, and Hamilton to Glasgow, with a branch from Thankerton or Symington to Edinburgh, as being a general route which would fulfil the greater number of requisites in the railway communication under consideration. We give this opinion, however, under the supposition that, antecedently to the construction of this line, the railway shall have been formed between Lancaster and Carlisle, or that both lines shall be undertaken nearly simultaneously; but should this not be the case, and parties should be found to construct the line from Darlington to Edinburgh, then the western route ought to be abandoned for the present, and in that event we should award the preference to the east coast line over the Hexham line."

LITERARY NOTICES.

The Railroad Monthly Journal, London: John Williams.

The *Railway Journal* now appears monthly, instead of quarterly as at first proposed. We received the numbers for April and May within a week of each other, and can thus notice them at the same time. There is an evident improvement in the character of this publication since it has come at shorter intervals before the public. The number for May is also an improvement on that for April, and in both of them subjects connected with railways and railway management are noticed and discussed in a bold, spirited manner, by writers evidently practically acquainted with their subject. The railway interest is become so important that we doubt not a numerous class of readers will be found for a monthly publication in which the prominent features of the subject are freely discussed, without entering into those details and wranglings which even in the weekly railway journals are extremely tedious. There is an excellent article in the number for May, in which the strange and unmeaning variations in the different Railway Acts are forcibly pointed out. Another article, on railway mechanism, we have inserted in another part of our present number. We regret that in a work of this kind, which is published at intervals sufficiently long to allow passion to cool and judgment to hold the balance, there should be so much indication of personal feeling and party hostility. We hope to see an improvement in this respect in future numbers.

Arithmetic Considerations on Marquoi's Parallel Scales, and the Protractor. By E. Clifford. London: J. Brettell.

The object of this little treatise is to extend the use of Marquoi's scales, which are not generally known, from its being erroneously supposed that they are exclusively adapted to military plan drawing. Mr. Clifford explains clearly the use of these scales, and shows that they may be generally very advantageously applied.

A Guide to Loan Societies. London: W. Strange.

The author of this Guide is far from friendly to the establishment of loan societies on their present

principles, as he considers many of them to be fraudulent schemes to raise money, under the pretence of relieving the necessities of the deserving. The tricks of these societies are exposed, and the unqualified system of borrowing which they create and encourage, is strongly condemned. The pamphlet, however, has a different and opposite object from the sentiments expressed in the introduction. It is a guide to that which it professes to condemn. The principal loan societies, amounting to nearly one hundred, are indicated, and the terms on which money is advanced by each are pointed out. After cautioning his readers from taking the tempting and noxious draught, the writer takes great pains to inform them of all the places where, and the mode in which, it can be best procured.

Gratuitous Copies *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of to-day.*

"The Inventors' Advocate" *is published every* Saturday Morning, *at* 7 o'Clock; and is regularly issued in Monthly Parts, of which 1 *to* 23 are now Ready.

"The Inventors' Advocate" is also published in Volumes, containing the Nos. of every 6 months.

THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, MAY 8, 1841.

We have always advocated the plan of a fixed duty on the importation of corn, in lieu of the present fluctuating scale, from a conviction that the principle on which the fluctuating duties were imposed, is not well founded in theory, and has proved injurious in practice. We have at the same time reprobated the agitation of the public mind on this question, and the attempts to make a breach between the manufacturing and the agricultural interests of the country; for we feel persuaded that the question cannot be satisfactorily adjusted unless both parties are consulted, and their interests are shown to be identical.

Entertaining these views, we regard the announcement by the Government of their intention to bring in a measure permitting the importation of foreign corn at a moderate fixed duty, with mixed feelings of pleasure and regret. We rejoice to think that the principle should be thus advanced with the support of the Government, though we lament that, owing to the circumstances under which the measure is proposed, it bears more the appearance of a political manœuvre, than a well-considered plan for the good of the country. As it is thus brought forward as a party question, instead of being supported with reference to its merits alone—as a matter in which such important and apparently conflicting interests are involved ought pre-eminently to be—it runs the risk of being made the mere stalking-horse of party contests. It becomes the more necessary, however, from this unfortunate position of the question, that those who keep aloof from political warfare, and view each matter that affects the real welfare of the nation on its merits alone, should endeavor to place the arguments for and against the present fluctuating duty in an impartial manner before the public, so that they may view it, if possible, freed from party bias.

Though we are strenuous supporters of the principles of free trade in all articles of manufacture—partly from the persuasion that it is a doctrine politically sound, and partly because we feel confident that the skill, industry, and capital of this country need only a fair field and no favor in any part of the world—yet we cannot carry out these views to the sudden destruction of the most important of all the productions of the country, which has been hitherto fostered and reared as essential to the well-being and even to the existence of the nation. Neither are we so sanguine as most of the anti-corn-law advocates, of the great beneficial effects to be derived from the constant influx of foreign grain. We neither expect that it would make bread much cheaper than it is after a good harvest at present; nor do we anticipate that the working classes would immediately derive much benefit from the change. On the contrary, were any sudden alteration to be made in the terms by which foreign corn could come into competition with that of home growth, the consequences we feel assured would be fatal not only to the large body of agriculturists, who comprise after all one half the population, but it would re-act with equal severity on the manufacturing interests. Any relaxation of the import duty should be made therefore with the greatest caution, and be gradually introduced, so as to enable the farmers who have taken leases and expended their capital on land on the faith of the continuance of the protecting duty on home-grown corn, to free themselves from those engagements, and to enter into other arrangements adapted to the altered state of their business. It is not from the diminution of the price of corn that we anticipate any advantage from a change in the present corn law, in the first instance at least, for any change that would produce that effect suddenly we should consider an evil. The advantage to be gained by the substitution of a fixed duty for a fluctuating one is a greater steadiness of price and the security of a supply from abroad in case of deficient harvests at home.

The present corn law is founded on the fallacious supposition that the produce of the kingdom is in average years equal to the consumption; and that in case of deficiency any quantity can be procured from abroad on opening our ports. Instead, however, of growing enough for our own consumption, we are obliged to depend generally for one-fifth the whole quantity consumed on foreign growers, and yet the duties charged on importation are so uncertain, that the foreign producer can never tell whether it will suit his purpose to grow corn for the British market. The regular calculations of trade are thus made to give place to mere speculation; and the supply of the most important article of food assumes the character of a gambling transaction. The difficulty of procuring a supply in times of scarcity is also greatly increased by the present uncertain regulations. As there is no certain quantity of corn grown abroad for the English market, the supply, after a bad harvest, becomes short; the quantity of corn on the Continent is not adequate to supply their own consumption; the price rises, the exportation of corn rouses the passions of the people, and the governments are compelled to prohibit its exportation. We are by these means cut off from those sources of supply, because, instead of encouraging the growth of corn for our probable wants, we have taken every means to check the cultivation of additional land abroad, and rely only on their surplus growth alone in case of need.

Our present corn laws are inconsistent, as well as impolitic. They assume a certain price as remunerative to the English grower in average harvests, at which price the duty on the admission of foreign corn amounts to a prohibition. If the crops prove deficient, of course the price rises, and the farmer, on the protective principle, has a right to expect that the loss he sustains by the deficiency of the crop will be made good to him by

the increased price. But here this fallacious protection deceives him. The foreign grower is then allowed to enter into competition, and in proportion as the crops have failed and his loss on that account is augmented, he is fated to see the foreigner enter the markets against him, on paying merely a nominal duty.

To the farmers themselves this uncertain state of the law must prove as injurious in its operation as to the rest of the country. A moderate fixed protective duty would place the corn trade on a solid basis, and enable the British farmer to calculate with greater certainty on his profits or loss from cultivating corn. In years of plenty he would be able to compete with the foreign grower, and in years of scarcity he would have no fear of an inundation of foreign corn to depress the markets. A steady trade in corn would conduce materially to the extension of our foreign trade, by establishing regular commercial dealings with the corn-supplying countries. At present the supplies are so uncertain that no regular reciprocating trade can be carried on, and when any sudden dearth arises, and we are obliged to seek for a large supply of corn from abroad, the country is drained of its gold instead of exporting its manufactures in payment.

A moderate fixed import duty on corn would, indeed, offer numerous advantages to the commerce and manufactures of the country, if it could be effected without injury to the agriculturists; for if not, any partial advantages that might be gained from an extension of foreign commerce would be dearly bought by the serious diminution of the home trade, and the want of employment for the laboring classes. The mutual dependence of the manufacturing, commercial, and agricultural interests cannot be too often nor too strongly enforced; especially at a time when political agitators are endeavoring to excite them against each other, and are representing their interests as diametrically opposed.

An important case relative to the disputed infringement of a patent came on for trial in the Court of Exchequer Chamber, on Tuesday, and continued till Thursday evening. The patent in question was for the application of the hot-blast in fires, forges, and furnaces. The patentee is Mr. Neilson, who took out the patent in 1828; and he and two other gentlemen, to whom the patent had been assigned, brought the present action against Mr. Harford and others, who had since made use of the hot-blast. The question turned principally on the description of the specification, and whether the similarity in the mode of heating and applying the air to furnaces adopted by the defendants was such as to amount to an infringement of the patent. On the latter point it appeared, that the patentee was not aware when he drew up his specification of the importance of the shape and size of the vessels in which the air was to be heated, and in this respect, the judge, Baron Parke, directed the jury to find for the defendants; whilst on other counts, declaring Mr. Neilson to be the inventor of the application of the hot-blast, that it had not been previously applied, and that it was of great use and benefit, the jury found for the plaintiffs. We propose to give next week a report of the trial at some length.

NEW INVENTIONS.

ELECTRO-MAGNETIC TIMEKEEPER.

Among other recent applications of electro-magnetic power is that of indicating time. The inventor of the apparatus we are about to describe is Mr. Bain, the contriver of the ingenious plan of sounding the sea by electro magnetism, which we recently announced, and which is now exhibiting at the Polytechnic Institution. The advantage proposed to be gained by this apparatus is to regulate a number of clocks by the movements of one, so that every clock in the circuit, though extended to a distance of several miles, may be regulated every hour, and keep accurate time with the original regulating clock. This is effected in the following manner. One of the wires from a small galvanic battery is connected with the escapement wheel of the regulating clock, and the wheel is so arranged that at every movement it forms and breaks connection with the second wire which completes the galvanic circuit. It will be readily understood that the instant the connection is formed between the two wires of the battery, electrical action will instantly operate at almost any distance to which the wires extend. The insulated wires thus connected with the regulating clock are carried to the other clocks that are to be regulated by it, and are made to act on electro-magnets, fixed to the dials of these clocks, once every hour; because the hand of the regulating clock touches the two connecting points of the wire once an hour. The duration of the electric action on each magnet may be for only half a second, but this is quite sufficient to attract a piece of soft iron which is attached to the joints of a pair of calipers, and causes them to close. The calipers in closing clasp the end of the minute hand of the clock, and bring it always to the same point; they immediately expand again, when the action of the electro-magnet ceases, by the force of a small spring, and the hand is free to move as before. By this operation of the calipers, or nippers, it will be seen that the minute hand of the clock is always brought to the same point every hour, and supposing the clock to vary as much as a minute or two, yet it would every hour be made to indicate the correct time, as it would then be set by the regulating clock. By this means upwards of three thousand clocks in different parts of a town may be regulated and made to keep accurate time by one good regulating clock, two insulated wires, and a small galvanic battery, that may be kept in constant action for less than sixpence a week. The worst clock may thus be made to keep time with the best, and at a very trifling cost. In addition to this mode of applying electro-magnetism to the regulation of clocks moved by ordinary clock-work, the inventor has contrived an electro-magnetic clock in which the electro-magnetic power acts as the moving power. We must defer our description of this apparatus till next week. [The claim to the invention of the electro-magnetic clock, which is disputed by Professor Wheatstone and Mr. Bain, does not refer to the peculiar application of that power we have now described, but to the clocks moved by electro-magnetism.]

IMPROVEMENTS IN THE DAGUERREOTYPE.

We recently noticed the great improvement in the Daguerreotype by Mr. Wolcroft, and its application by his process to the taking of likenesses. A modification of the apparatus has been made at Vienna for the same purpose, but whether it be the same as Mr. Wolcroft's we have no means of judging. The following notice of the German application of the invention we take from a French paper.

"The photographic apparatus for taking portraits invented by M. Voigtlander of Vienna, has already received the approbation of the Academy of Sciences and of the Society for Encouragement. M. Payen, professor at the Royal Conservatory of Arts and Trades, who is always active in discovering the new practical inventions which interest his numerous audience, gave in the course of his recent lecture an explanation of this ingenious apparatus. The portraits have been admired by connoisseurs, and it has been acknowledged that such great perfection has not been previously attained. This opinion has also been expressed by M. Daguerre, one of the most competent judges on this subject.

NEW DESTRUCTIVE MISSILE.

An inhabitant of Obernay (Lower Rhine) has, after many attempts, succeeded in the construction of a projectile of the most destructive kind, by means of which assaults will henceforth be easily repulsed, for every breach may be defended and every house rendered impregnable. These machines, the strongest of which are to be used in the defence of ramparts, are like cast-iron shells, and contain, besides a charge of 90 balls, 2 kilogrammes of shot, as well as inflammable substances, which take fire as soon as they come in contact with any object, whatever it may be. Other machines, adapted to be hurled by the hand, may be used in boarding, in driving away the enemies' ships, and setting fire to them at the same time. Smaller engines can be substituted with great advantage for grenades, and may be used by the infantry in battle. The inventor having applied to the Artillery School of Strasburgh, a commission was appointed for the purpose of examining these warlike implements. An experiment was made on the 9th Nov. 1840, which succeeded perfectly, but the vexations and delays to which he was subjected, induce him to sell his right to the discovery. Considering his want of fortune, he is willing to enter into arrangements with persons who wish to become purchasers of his secret, after a renewal of the trials have been made, to prove the destructive effects produced by this invention.—*Moniteur Industriel.*

RAILWAY MECHANISM.

(*From the Railway Monthly Journal for May.*)

The following anti-friction mixture has been recommended for railway wheels and other machinery. It is stated not to liquify by heat; if so, it is a great advantage. Black-lead powder, fifty parts by weight; hogs' lard, the same; fresh soap, the same; quicksilver, five parts. The lard and mercury are to be well mixed in a mortar, and the black-lead gradually added, after which the soap is to be mixed in.

A new wheel, the invention of Mr. H. Dircks, of Liverpool, has been spoken highly of for railways. The first wheels used on these roads were entirely of wood; to these succeeded cast-iron, then a wrought-iron tire was added, and finally the whole was made of wrought-iron. Another kind is the plate wheel. Mr. Dircks's wheel is made either of cast or wrought-iron—we should prefer the latter: it has a deep channelled tire, in which are placed blocks of African oak, about 4 inches by 3½, their pores being filled with unctuous preparations, to counteract the effects of moisture by capillary attraction. The grain is placed vertically throughout, there being about thirty blocks in each wheel, which are retained in their places by bolts; the wheel is then turned, and has a wooden tire and an iron flange. The wood wears a long time, and

can be replaced at a small expense, without unkeying the wheel from the axle; and the advantage consists in less jarring and smoother working on the rails, and more adhesion in wet weather; the rails also will be less worn, and the chairs, &c., receive less injury; there is also less noise than with iron wheels. We should think teak would be an excellent wood for this purpose.

Another new wheel is proposed, by Mr. Gooch, of Paddington, with a steel-faced tire. The wrought-iron tire and the steel facing are welded together, and, after being turned, is heated red-hot, and hardened by water; rivets are also used. We should doubt the utility of this process: in the first place, iron and steel are subject to a different law as to expansion and contraction: in the second place, hard steel is very brittle; and until more attention is paid to the joints of the rails than we see at present (for we lately measured some one-fifth of an inch apart), we should fear it would risk the breaking of hard steel, at high velocities; thereby we want more yielding, not less, especially on lines laid on stone blocks: and, lastly, the expense must be greater than with merely a wrought-iron. A simpler plan would be, to case-harden the wrought-iron tire with prussiate of potash, instead of welding on a separate steel facing.

The railway tickets, on the Manchester and Leeds line, invented by Mr. Edmondson, are printed by a machine which gives each a progressive number, and arranges them in order. Two boys lately printed 10,000 tickets in four hours.

A very simple, cheap, and we are sure most effective, buffing apparatus has been proposed; it consists of two ordinary elliptic coach-springs, which are placed together, and a pair of these fixed at each end of the carriage-frame, with their planes of action horizontal. Two iron straps pass one above and the other below these, and are continued beyond the framing at either end; to these are fixed the buffer heads. Between these straps and each pair of springs is filled in with wood. The blow received is transmitted to the springs at the far end of the carriage only; and a great improvement would be to bring both pair into action, which could be very easily done; it would then form a far better and far cheaper apparatus than that now in use.

A new railway break is proposed by Mr. Davies, of Wigmore-street, Cavendish-square: it is an improvement on the present very bad one; inasmuch as it brings equal action on both the front and back of all four wheels, but is heavy and costly. A better and cheaper one is as follows:—a spring encompasses about three-fourths of each wheel, similar to those used to lower goods by in cranes; two sets of levers are fixed, one to each foremost and hindmost end of the spring round the wheels, on one side of the carriage, and the other to each adjacent end of the springs. The handle of the break causes these to tighten all four ends of the springs together, and would thus form a very efficient break. It should be fixed to all four wheels, and have a broad curved side to take hold of the flange; for in consequence of the curved tire the main grip would be on the face of the wheel.

Mr. Stather has invented a new "controller" for steam-engines, enabling the captains of steam-boats, or the helmsmen, to reverse the engines, stop them, and regulate completely their speed, without having to call to the engineer. This, if effected, is a long-wanted improvement. The eccentric is not thrown out of gear, as by the present method to stop the engine, but remains as before. The adoption of this to locomotives, enables them to work with only one eccentric rod, which will reduce their expense from £200 to £300.

HICK'S EXPANDING MANDREL.*

There are in the construction of steam-engines, mill-gearing, &c., a great number of parts, such as steps for plummer-blocks and other pedestals, also for connecting rods, cross-heads, &c., bushes for piston-rods, and a variety of other parts, which require their outer diameters to be turned true, or concentric with the hole through them. The hitherto-adopted mode of performing this is by first taking a piece of iron whose diameter shall be a little larger than the hole through the article to be turned upon it; the piece of iron, which is usually called a mandrel, is then turned down or reduced until it is of such a size as to admit of being driven tight into the hole for which it is intended, which being done, the article upon it is ready for turning; but this preparation often requires a longer time than is even occupied in executing the whole of the turning required upon the article for which the mandrel has been so prepared. To diminish this great loss of time, Mr. Hicks has invented a mandrel, which he calls an expanding mandrel.

Mr. H. does not propose to make one mandrel take more than a certain range of holes; because, if it were sufficiently strong for very large holes, it would be inconvenient for very small ones. He has therefore adopted the following sizes:

$1\frac{1}{4}$ inch to expand to $1\frac{3}{4}$
$1\frac{3}{4}$ .... $2\frac{1}{4}$
$2\frac{1}{4}$ 3
3 4
4 5
5 .... $6\frac{1}{2}$
$6\frac{1}{2}$ 8
8 .... 10 and in like proportion.

He has had some of these sizes in use in his works for about two years, and can speak confidently of their advantages, which effect a saving of the *whole* time required to prepare a common mandrel, and afford the facility of putting on or off any piece of work without damaging it, as is often the case with the common mandrel in *driving* on or off, particularly when the piece of work has been highly finished. But its principal advantage is that of entirely doing away with the necessity of keeping a large stock of mandrels of the common description, amounting in some large establishments to four or five tons; and these, with the labor *once* put upon them, will be worth £600 to £700; whereas mandrels of Mr. Hick's improved plan, to do the same work, will not cost more than £100, for which sum two sets could be furnished, including every size, from $1\frac{1}{4}$ to 12 inches.

* From the Trans. Soc. Arts, 1840, p. 87. Mr. John Hick, Jun., of Bolton, Lancashire, received the silver medal for this improvement.

SCIENTIFIC CORRESPONDENCE.

ON CRANK ACTION.

To the Editor of the "Inventors' Advocate."

Sir,—You ascribe the question I have proposed to motives, which I must confess appear to me to be somewhat ungenerous, and of which I believe any disinterested person would, on reading my last letter, freely acquit me; how you can possibly fancy that they were proposed with any intention of "entrapping you into concessions" I am at a loss to divine, for supposing that such were the case, would your admissions establish the *truth* of my argument? It is *truth*, and truth alone, that I am seeking to establish, and the simplest way of arriving at it, is to separate from the one subject under consideration all extraneous matter, however intimately it might be connected with it in practice.

In these discussions I am not only addressing you, but those of your readers who may feel interested in them; and I should be the more pleased did some of your correspondents take the field either on one side or the other; error would be the more readily discovered, and perhaps new views be brought to bear on the subject: this for their consideration.

You say that "as at present advised" our opinion is, that the communication of motion by the crank must be attended with great loss of power, even could the connecting-rod be made to act constantly parallel to the piston-rod. At present, I will be satisfied with this cautious answer, and, in opposition, beg to submit for your consideration the following table, which I have calculated to every 10 degrees. Were a similar table calculated for every minute or every degree, the small amount of loss exhibited below would vanish.

Table 1st, having the amount of leverage on the crank for every 10 of its revolutions, the connecting-rod acting upon it in lines parallel to the piston-rod.

Radius of the circle whose circumference is equal to the length of the stroke being 1·000.

FIRST.

Degrees.	Amount of Leverage.	Amount × by 100 lbs.
0	·0·0	0·000
10	·272766	27·2766
20	·537244	53·7244
30	·785398	78·5398
40	1·00968	100·9680
50	1·20330	120·3300
60	1·36035	136·0350
70	1·47606	147·6060
80	1·54693	154·6930
90	1·57079	157·0796
100	1·54693	154·6930
110	1·47606	147·6060
120	1·36035	136·0350
130	1·20330	120·3300
140	1·00968	100 9680
150	·785398	78·5398
160	·537244	53·7244
170	·272766	27·2766
180	·00	0·0000
		1795·4252

$$\frac{18}{1795{\cdot}4252} = 99{\cdot}7459$$

Thus showing a loss of ·2541 per cent.

The numbers in the above table under "amount of leverage" are the lengths of the cosines of the respective arcs, reversed, and any person with a table of logarithms and a slight knowledge of trigonometry, could easily prove their correctness should there be any doubt on the subject. If I have time next week I purpose calculating the effective power with a connecting-rod three times the length of the stroke, and not moving in lines parallel to the piston-rod.

I am, Sir, your obedient servant,
Norwich, May 5, 1841. F. Ham.

[Mr. Ham's calculations appear to have no reference to the angular direction in which the power acts on the crank at every point of its revolution but two, which we consider the chief source of loss of power, and is entirely independent of the relative motions of the piston and connecting-rods. We are sorry to see that he has misunderstood what was intended for badinage, as a serious lawyer-like reservation of opinion, which we thoroughly despise.]

ELECTRO-MAGNETIC CLOCKS.

To the Editor of the "Inventors' Advocate."

Sir,—In reference to Mr. Lamb's letter in the Inventors' Advocate of the 24th ult., respecting the invention of the Electro-Magnetic Clocks, I must say that it would have been more to Professor Wheatstone's credit if he had come manfully forward himself, and stated his claims, instead of directing his workman to do it for him; but he has declined coming forward, notwithstanding I called upon him in my last letter for his own reply. It has come to my knowledge that he has been circulating various misrepresentations respecting me, namely, that I have been employed by him as his workman, and that I derived my ideas from him. I beg to state that those assertions have not the smallest foundation in truth. I never was in Professor Wheatstone's employment; neither was I ever engaged on any piece of work of his, and the

only transactions which ever took place between Professor Wheatstono and myself related entirely to inventions of my own; and if it was not that I was recommended to Professor Wheatstone with those inventions, it is most likely I never should have known him to this day; and so far from me receiving my ideas from him, he took good care never to show me anything but what he had fully secured to himself by patent.

Now for Mr. Lamb's assertions in this affair; for I see that in his last letter he has departed from various important points which he admitted to me in the conversation I had with him on the subject. In the first few words of conversation I had with him, I saw that he was not only an unwilling witness, but that he endeavored to advocate his employer's cause with the utmost zeal, and it was only by close questioning that I was able to arrive at the following facts, which I did not think he would attempt to deny. These facts were, that the proposed instrument in question was to be the works of a common spring clock without a pendulum, the action of which was to be regulated by electric currents, in the same manner as Professor Wheatstone's other telegraphic instruments; and the only difference between it and the former instruments made by him for Professer Wheatstonc, was, that it was to have hands to point to the signals, instead of a revolving dial or disc to carry the signals to the point of indication. And to make more sure whether or not Professor Wheatstone intended to show time by this apparatus, I inquired of Mr. Lamb, most particularly, if he received any instructions to make or fit up a clock to transmit the electric currents, for the purpose of working the proposed instrument. In answer to which he told me, most distinctly, that he did not receive any such instructions, neither did he hear any mention made of it at that time. I also asked him particularly what ProfessorWheatstone called the proposed instrument, and he said an Electro-Magnetic Telegraphic Clock. Mr. Lamb also calls it so in his first letter. Now this is the name given by Professor Wheatstone to those telegraphic instruments in which he employs clock-work, or rather the power of a clock's main-spring transmitted through a train of wheels and pinions, for the purpose of assisting the electricity in carrying round the signal disk. Now those instruments of Professor Wheatstone's are not clocks, properly speaking, because they are used for a different purpose, and he merely calls them so because there is common clock-work in them; but our electro-maghetic clocks are entirely different from this in every respect;—in the first place, Mr. Wheatstone's instruments could not be called clocks at all, if it were not that he employed common clock-work in them; but our instruments are called clocks because they are for the purpose of showing time, and the object of the invention of our instruments is to do away with common clock-work altogether, to do away with that very work by using which Professor Wheatstone calls his instruments clocks.

But whatever they, Mr. Wheatstone and Mr. Lamb, may now endeavor to put forth on the subject, I know by the facts reluctantly admitted by Mr. Lamb, and which I have now mentioned, and by the various remarks made by Professor Wheatstone himself at different times, that he had no intention of employing electro-magnetism to the working of clocks, until I communicated to him my methods of doing it; neither did he see the advantages to be gained by it until I pointed them out to him, and it is easy to convince any one of this, by Professor Wheatstone's own proceedings. He says that he gave directions on the 6th of January, 1840, to his workman to make an electro-magnetic clock, but it so happens that it was not made, nor anything further done in the matter until after I communicated my method to him, which was about eight months afterwards; it was then gone on with so quickly, that a great many were made in the next few months. This appears very strange, if Professor Wheatstone had the invention in view before; but what is certainly more strange still is, that the most intelligent and industrious ProfessorWheatstone, on the 21st of January, 1840, only two weeks after he gave the said instructions to his workman, took out a patent in which he might have easily secured the invention, yet nothing of the kind appears in it. He had six months to mature the invention; namely, till the 21st of July, before he was obliged to specify, yet nothing was done by him all that time. Now any person that knows Professor Wheatstone, I think will agree with me in the opinion, that had he known of the invention, and the advantages to be gained by it, he would not only have gone directly on with it, but he would have secured it in his patent, and more especially when he knows that the invention is many times more valuable than what he then patented. I could have stated many other circumstances to show that Professor Wheatstone did not know that electro-magnetism could be applied advantageously to the working of clocks until I communicated it to him; but I think that this is sufficient at present. I therefore conclude, by again calling upon Professor Wheatstone to answer this letter himself; and

I remain, Mr. Editor,

Your much obliged servant,

ALEXANDER BAIN.

35, Wigmore-street, Cavendish-square,
April 27, 1841.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING MAY 10, 1841.

Monday	Geographical Society	9 P.M.
Tuesday	Medico-Chirurgical Society	8½ P.M.
	Chemical Society	8 P.M.
	Civil Engineers	8 P.M.
	Zoological Society	8½ P.M.
	Royal Botanic Society	8 P.M.
	Uranian Society	8 P.M.
Wednesday	Society of Arts (Illustration)	8 P.M.
	Medico-Botanical Society	8 P.M.
	Graphic Society	8 P.M.
Thursday	Royal Society of Literature	4 P.M.
	Royal Society	8½ P.M.
	Antiquaries Society	8 P.M.
Friday	Astronomical Society	8 P.M.
	Royal Institution	8½ P.M.
Saturday	Mathematical Society	8 P.M.

ROYAL INSTITUTION.

April 23. Friday Evening Meeting.

Mr. E. Cowper delivered a lecture "On the recent Improvement in Chronometers and Astronomical Clocks," made by Mr. Dent, of the Strand. The models and drawings exhibited had been laid before H. R. H. Prince Albert, on the Tuesday previous, by appointment, who expressed himself satisfied with the new arrangements. Time was stated to be an abstract idea, and is usually reckoned during the passage of the sun from one part of the heavens to another. It is usually computed by a pendulum or spring, either, being made to vibrate in equal times. The motion of the pendulum is that of a cycloid, as this is the only curve down which a body will move in equal times. The vibration of the length of the pendulum, together with the action of heat or cold, varies the motion, and consequently the time—in fact, the pendulum was considered as the governor of the moving power. Mr. Cowper, after entering into various mechanical details connected with the construction of clocks, &c., described in detail the various escapement wheels; but as he was in the middle of the subject an alarm of fire in an adjoining hotel in Albermarle-street was given, which soon burst into flames, producing considerable alarm in the neighbourhood, and illumined the sky-light of the institution, so as to excite the attention of the audience, most of whom left the theatre to witness the conflagration, and the lecture was concluded.

ENTOMOLOGICAL SOCIETY.

May 3. W. W. Saunders, Esq., F.L.S., &c., President, in the Chair.

Mr. Stephens communicated to the Society a notice of the occurrence of a monstrosity of *Harpalus rufimanus*, a coleopterous insect, found on Hampstead Heath by Mr. Bond. It consisted of two or three tubes proceeding from one femur. The secretary read a paper on the nests of the *Chlamis* and *Lamprosoma*, two beautiful genera of Brazilian coleoptera. The former exhibited a tube with a large globular mass at the end, the tube being covered by a mantle which is supposed to be excrementitious, as in the case of the European genera *Lema* and *Chryoseries*.

Mr. Meyer, to whom Mr. Westwood was indebted for the *Lamprosoma* specimens, found the nest frequently when in Brazil, on trees of the genus *Bombax*. It is oval, and has a small hook at the extremity:—in this they undergo their transformation. In some of the specimens, parasites of *Adscitous Ichneumonidæ* were found, a description of which he promised to lay before the society at some future period. A letter was also read from the Rev. Mr. Cox, accompanied with specimens of the larva of a *Melitæa, Vanessa*, which were found in immense numbers in Somersetshire, on the grass after a dark cloud had passed over. Mr. Waterhouse described a new genus of *Carabidæ*, sent to him by Mr. Melly of Liverpool, from the western coast of Africa. Its place in the system seemed to be between *Apotomus* and the group containing *Tefflus, Pamborus*, and *Cychrus*; he proposed for it the name of *Disphædacus Gambianus*. A drawing and specimen accompanied the paper. The secretary commenced a paper on the *Panorpidæ*, in which he described several new species from India, North America, &c.

LINNÆAN SOCIETY.

May 4. Robert Brown, Esq., D.C.L., V.P., in the Chair.

This being the meeting previous to the anniversary the society proceeded to elect Mr. Jansen and Mr. Westwood auditors, and Von Beer, and other eminent continental naturalists, as foreign members. A long paper was read from C. F. Blundell, Esq., being "Remarks on certain Plants of Brazil, with Descriptions," containing many interesting observations on some which have been hitherto named and characterised. Most of the specimens alluded to in the commuuication were presented to the collection of the Linnæan Society some years since.

Charles Lucien Bonaparte, Prince of Cauino (late Musignano), was present, and laid on the table for inspection an interesting drawing of a new species of *Fulica*, found in the South of Europe, very like a species found at Madagascar, together with some fishes, &c. He also presented his new arrangement of the vertebrated animal kingdom, each class of which is exhibited, with characters of the families and sub-families, on separate sheets of paper.

ZOOLOGICAL SOCIETY.

April 29. Lord Braybrooke, V. P., in the Chair. Anniversary Meeting.

From the report of the auditors it appeared, that the receipts of the past year were £12,732 1s. 3d., of which £540 6s. was received as sums due from previous years; £,5368 5s. from annual subscriptions; £400 for garden rent; and £4,584 9s. for admissions to the gardens. The expenditure of the last year was £11,838 19s. 6d., of which £10,137 was on account of the current year, and £1,233 17s. 6d. was invested in the funds. The cost of animals was £786 9s., provisions £2,136 15s., and £1,510 13s. 3d. for works. The assets were £14,633 4s. 5d., independent of the living and preserved collections, which were of great value. The liabilities were but £762 17s. 7d., and there were

no contracts pending. There was a deficiency from the previous year of £699 10s. 10d., the falling off of the receipts under the important item of admissions to the gardens amounting to £419 14s. The museum still remained in an unsettled state, and had lately been valued by order of the council, when the worth of the collections was estimated at £10,965. The number of specimens in the menagerie was stated to be 894, of which 352 were mammals, 524 birds, and 8 reptiles; and of these, 23 mammals and 9 birds had never before been seen in this country. The number of visitors in the past year was 141,090, of which number 49,320 were privileged, and 91,689 paid.

The reports were severally adopted, and it was stated that a special general meeting of members would be held on the 20th of May, to decide upon the future disposition of the museum. The ballot for officers then took place, when the principal were re-elected to their several offices.

INSTITUTION OF CIVIL ENGINEERS.

At a recent meeting a paper was read by Mr. S. Seaward, on the adaptation of steam power to tonnage in steam navigation, and on the employment of auxiliary steam power in sailing ships.

The weight of the powerful machinery and the fuel, and the consequent loss of space for cargo, together with many other circumstances attendant on the present construction of steam vessels, induced the author (who received the education of a seaman, and has since had extensive practice as an engineer) to believe that a more efficient mode of applying steam power for long sea voyages might be adopted. Notwithstanding the great improvements which have taken place in the construction of steam vessels, and their machinery, it would appear that the duration of the voyage ought not to exceed twenty days, after which time a fresh supply of fuel becomes necessary: hence, steam has rarely been adopted for very long voyages. The reason of this limit to the duration of the voyage of a steam vessel, as at present equipped, is that an increase of power does not produce a corresponding increase of speed, while the weight of the machinery increases in proportion to the power employed, and in some cases exceeds it; for instance, small engines, with the water in the boilers, generally weigh about one ton per horse power, while in some large engines the ratio is nearly twenty-five cwt. per horse power. A quadruple increase of power will not produce double the original velocity in a steam ship, although, in theory, such is assumed to be the case; for as the weight is more than doubled, the immersed sectional area becomes greater, and a still further increase of power is necessary. It has been shown by experience, that if a vessel with a given power is propelled through the water at the rate of eight miles per hour, her speed cannot be doubled, even though the power be multiplied twelve times, and the entire hold of the vessel occupied as an engine-room. The weight of fuel is also in direct proportion to the size of the engines; so that taking, for example, two vessels of two hundred and of four hundred horses power respectively—that of the higher power will have to carry nearly double the weight both of fuel and of engines, and it is still questionable whether the increased force will propel the one ship more than $1\frac{1}{2}$ mile per hour faster than the other. The space occupied by the engines and fuel in the most valuable part of the ship, is also an important consideration: neither the "President" nor "British Queen" steamer, although of two thousand tons measurement, is capable of carrying more than five hundred tons of cargo when the fuel is on board. The author then examines the question of employing too much power in a steam vessel, and refers to the "Liverpool," as an instance that such may be the fact. It appears that with the original dimensions of thirty feet ten inches beam, and engine power of four hundred and fifty horses, being a proportion of power to tonnage of about 1 to $2\frac{1}{4}$, the vessel was immersed four feet beyond the calculated water line, and a decided failure was the natural consequence; but when the breadth of beam was increased to thirty-seven feet, augmenting the capacity four hundred tons, and giving the proportion of one horse power to $3\frac{3}{4}$ tons burden, the performance of the engine and the speed of the vessel were both materially improved. The "Gem," Gravesend steamer, one hundred and forty-five feet long, by nineteen feet beam, had two engines of fifty horses power each; the speed was insufficient, being only twelve and a half miles through the water; but when the same engines were placed in the "Ruby," which was one hundred and fifty feet long, and nineteen feet nine inches beam, the velocity of the latter vessel was thirteen and a half miles per hour. A pair of engines, of forty-five horses power each, were then placed in the "Gem," without altering the vessel, and in consequence of the diminished weight and draught of water, her speed then nearly equalled that of the "Ruby." The author does not condemn the application of considerable power for vessels, provided it can be employed without materially increasing the weight and the area of the immersed midship section.

It appears that the length of a steam voyage, to be profitable, is at present limited to twenty days for the largest class of steamers; that we have about thirty others which can approach twelve days, while the majority cannot employ steam beyond eight days successively, without a fresh supply of fuel. It is evident, therefore, that more efficient means must be adopted for the general wants of commerce in our extended intercourse with the East and West Indies, the Pacific, Mexico, Brazil, Australia, and all the distant colonies, which now demand rapid communication with England. The author refers to a pamphlet, published by him in 1827, entitled "Observations on the possibility of successfully employing Steam Power in navigating Ships between this Country and the East Indies by the Cape of Good Hope." He therein proposed that largo square-rigged ships, of fifteen hundred to eighteen hundred tons measurement, should be fully equipped and constructed, so as to sail ten or eleven miles per hour with a fair wind; that they should carry engines of small power, to assist the sails in light winds, propel them at a moderate speed during calms, work into and out of harbour, &c., and thus shorten those portions of the voyages wherein so much time is usually lost. To all well-built good-sailing vessels, of four hundred tons and upwards, "auxiliary steam" is applicable. A steam-engine of the necessary power can without inconvenience be placed in such vessels, either on or between decks, so as to propel a ship at the rate of four to five nautical miles per hour in a calm, and for this speed a proportion of one horse power to twenty-five tons is amply sufficient. The practicability of applying this system to East Indiamen and other similar vessels is then examined at length, and it is shown that the ordinary speed of these ships under sail is, before the wind, eleven or twelve miles per hour, and in a gale thirteen to fourteen miles per hour, which is greater by two or three miles per hour than that of any ordinary steam vessel when under sail, on account of the latter being impeded by the wheels trailing in the water, and the slightness of their masts, spars, and rigging. The auxiliary steam power might, therefore, be efficiently applied, either by using it alone, or in conjunction with the sails, so as to keep up a uniform speed, by which a great saving of time could be effected on a long voyage.

The conditions of sailing and steaming voyages to India, with the influence of the trade-winds, are then examined, and the author proceeds to detail the experiments made by him on board the "Vernon" Indiaman, which was the first sailing vessel that actually made a voyage out and home with "auxiliary steam." The "Vernon," built in 1839, by the owner, Mr. Green, was one thousand tons burden; the sailing speed was about twelve to thirteen miles per hour in a fresh gale, and being from her frigate-build well calculated for the experiment, it was determined to equip her with a condensing engine of thirty horses power, placed midships on her main deck, between the fore and main hatchways: the space occupied being twenty-four feet long by ten wide. The weight of the machinery was twenty-five tons, and it was so arranged that the motion was communicated direct from the piston cross-head by two side rods to the crank on the paddle shaft, placed immediately behind the lower end of the steam cylinder, which was horizontal. The wheels were fourteen feet diameter, projecting five feet, and were so constructed that the float-boards could be raised to suit the draught of water of the ship; or they could be taken entirely away, if necessary, leaving the shafts projecting only eighteen inches beyond the sides. Under ordinary circumstances they were disconnected from the engine by a simple contrivance, consisting of a moveable head attached to the crank on the paddle shaft, by turning which one quarter of a circle, the crank pin was liberated, and the wheels turned freely round. The "Vernon" thus equipped, having on board nine hundred tons of cargo, and sixty tons of coal, drew seventeen feet of water. In the first trial the speed of the vessel, under steam alone, was five and three-quarters nautical miles per hour, demonstrating how small a power is necessary for a moderate speed. She then started for Calcutta, and though the piston rod broke three times during the voyage, owing to a defect in one of the paddle-shaft bearings, the passage was satisfactory. The details are given minutely, as are also those of the homeward voyage, which was performed from Calcutta to London in eighty-eight days, to which must be added seven days for necessary delay at the Cape, making a total of ninety-five days, which is the shortest passage on record. For the purpose of demonstrating the ratio of power to velocity, a table was also given showing the velocities of ships of different tonnage, having steam power of various ratios, deduced from upwards of one hundred experiments on large steam vessels.

Mr. George Mills, from his experience as a ship-builder at Glasgow, was enabled to confirm all that Mr. Seaward had advanced. On the Clyde the employment of an excess of power in steam vessels had been carried to the greatest extent, without producing corresponding advantages. It would appear that the same error had to a certain degree been committed on the Thames, but less than on the Clyde. He believed that on the Thames no vessels had so much as one horse power for each register ton, whereas on the Clyde there were steamers of seventy to eighty tons register, having single engines, with cylinders of fifty-four inches diameter, which was more than one hundred horses power. As to the speed attained, he had seen three steamers of identical tonnage leave the Broomielaw at the same time, their engines being respectively of one hundred and ten, eighty, and sixty horses power; yet their speed was in the inverse ratio of their power: the vessel with the smallest engine arrived at Greenock first, the greater power second, and the greatest last. These remarks were only applicable to river boats. With regard to sea-going vessels, the system had not been carried to so serious an extent, yet with them the average proportion was about one horse power to two register tons, and some few reached as high as one horse to one and one-eighth of a ton. As an example of an augmentation of power producing an opposite result from that which was intended, Mr. Mills mentioned two vessels called the "Tartar" and the "Rover," built by him and his (then) partner, Mr. Charles Wood. They were each of about two hundred and twenty tons register, built from the same draught, and in every respect as similar as possible—except that the engines, which were by the same maker, were respectively of one hundred and seventy and one hundred and thirty horses power; yet whenever they worked together, the one with the smaller power proved herself the faster vessel, either in a calm, with the wind, or even against it. The "Achilles," Liverpool steamer, which lately had an addition of thirty feet to her length, and eighteen inches to her breadth, augmenting the tonnage about one-fifth, had improved her speed upwards of one mile per hour, although she carried a much heavier cargo than before.

The President observed, that the condemnation of

large power should not be carried too far, as experience alone had produced the increase of weight, strength, and power of the present engines, compared with those of the early steamers which were built, instancing the Halifax Packets (Cunard's), which, with their great power in proportion to tonnage, had performed their duties satisfactorily.

Mr. Mills explained that the Halifax Packets were built for the especial purpose of carrying the mails only, to perform the voyage in a given time, —about twelve days.

Mr. Field agreed with the principal part of Mr. Seaward's paper, but he would prevent an erroneous conception of the term over-powering a steamer. A vessel could not have too much power, provided that power could be advantageously applied, without causing too deep an immersion.

MR. FRANCIS BRAMAH AND MR. OLDHAM.

The annual report of the Council of the Institution of Civil Engineers contains, among other notices of deceased members, the following memoirs of Mr. F. Bramah and Mr. Oldham.

"Francis Bramah was the second son of the late Mr. Joseph Bramah, whose numerous inventions, perfection of workmanship, and genius in the mechanical arts, have rendered his name so widely and justly celebrated. The opportunities afforded to the son were ardently embraced by a mind of no ordinary powers, deeply imbued with the love of knowledge. Although his attention was, in early youth, more particularly directed to branches of minute mechanical construction, his acquaintance with the principal departments of professional knowledge and general science was very extensive. His attachment to the arts and to science was deep and sincere, and, among many proofs of this, may be particularly mentioned the valuable and essential services which he rendered to your late honorary member, Thomas Tredgold, both in his professional pursuits, and in the prosecution and verification of his theories and calculations. Mr. Bramah being professionally engaged at Buckingham Palace, in connection with some other engineers, difference in opinion existed and discussion arose as to the true principle upon which the strength of cast-iron beams, to resist stress and flexure, ought to be estimated, and with a view of verifying the principles laid down by Tredgold, he instituted a very extended series of experiments on the deflection and strength of cast-iron beams. These he presented to the institution, and they are published in the second volume of your 'Transactions.'

"Several important works were executed under his direction, among which the iron work of the Waterloo Gallery at Windsor Castle; the cranes, the lock gates, and their requisite machinery, at the St. Katharine's Docks; and the massive gates at Constitution Hill and Buckingham Palace, may be particularly mentioned. Mr. Bramah was an early and deeply-attached member of this institution; his constant attendance at the meetings, the information which he communicated, and his unwearied zeal as a member of the council, cannot be too highly estimated, and his loss will be deeply felt and regretted within these walls. The variety of his attainments, his refined taste in the arts, his amiable character, and the warmth of his affections, had secured to him the respect and esteem of a most extensive circle of friends, by whom, as indeed by all in any way connected with him, his loss will be most deeply and sincerely felt.

"John Oldham, the engineer of the Banks of England and Ireland, was born in Dublin, where he served an apprenticeship to the business of an engraver, which he practised for some time, but subsequently quitted to become a miniature painter, wherein he acquired some reputation. He pursued this branch of the arts for many years; but, having a strong bias towards mechanical pursuits, he devoted much of his leisure time to the acquisition of that knowledge which was to prove the foundation of his future celebrity. In the year 1812, he proposed to the Bank of Ireland his system of mechanical numbering and dating the notes, and, on this being accepted, he became the chief engraver and engineer to the establishment. The period of twenty-two years, during which he held this appointment, was marked by continually progressive steps of artistical and mechanical ingenuity. The various arrangements which he projected and carried out attracted great attention, and conferred considerable celebrity on the establishment with which he was connected.

"The late Governor of the Bank of England, Mr. T. A. Curtis, had his attention directed to these important improvements, and under his influence the whole system of engraving and printing, as pursued in the Bank of Ireland, was introduced into the national establishment of this country, under the superintendence of its author, who continued in the service of the Bank until his death.

"The ingenuity of Mr. Oldham was directed to other objects, especially to a system of ventilation, of which an account was given by the author during the session of 1837. Great versatility of inventive faculty, persevering industry, and social qualities of the highest order, were the prominent features in his character; and the success which attended his exertions is one of the many gratifying instances to be found in the history of this country, of talents and industry, destitute of patronage, attaining to eminence in the professions to which they are devoted."

SCIENTIFIC MEMORANDA AND NOTES ON ART.

Royal Institution.—The anniversary meeting was held on Saturday, Sir Oswald Mosley, Bart., M.P., in the chair. The report of the visitors announced an increase of six in the number of composition members over that for the preceding year, out of the total number of admissions of new members in 1840, amounting to thirty-six, which had occasioned an increase in the income of that year, under that head, of £252. There had also been a great increase in the amount of receipts from subscribers to the lectures, which were £534 9s., instead of £404 5s. in the last year. On account of the excess of the receipts a sum of £200 had been voted to the library fund. Sir James South feelingly alluded to the temporary withdrawal of the services of Dr. Farraday from the institution, which was responded to with sympathy by the meeting.

United Service Institution.—The ordinary meeting of this society was held on Monday evening. The presents received for the library and museum announced and exhibited, included, from Colonel C. R. Fox, a set of casts in lead from the dies of Beckher, the notorious forger of ancient coins; from Major Wathen, a box containing a set of ingeniously-formed figures for the elucidation of cavalry movements; from J. G. Frith, Esq., an Affghan warrior's dress; from Colonel Hamilton Ebrington, a sword-blade carried by an officer who was killed by a corporal of Colonel Ebrington's Light Company whilst leading an advanced party which attacked Hougomont at the battle of Waterloo; from Sir William Dillon, a Chinese sword, presented to him by a mandarin at Canton; and from Lady Harris, some beautiful specimens of coral. Mr. Parrot delivered a lecture on explosive compounds. On Tuesday Mr. John Wallis read the first of a course of lectures on astronomy.

Orthopedic Institution.—The first anniversary festival of this institution, the object of which is to effect the cure of club-foot, and other contractions in the limbs, took place on Thursday evening at the Albion Tavern, Aldersgate-street, the Earl of Eldon in the chair. The objects of the society not only embrace the cure of club-foot, but also the cure of contractions in the limbs generally, whether in the hands or feet. The noble earl stated that the operation for the cure of club-foot was attended with very little risk indeed, besides being extremely simple; and that, moreover, the time occupied by the operation was incredibly short. Casts are taken of the limb affected, both on the entry and on the departure of the patients.

Royal Academy.—On Saturday the members of the Royal Academy of Arts gave their anniversary dinner at their apartments in Trafalgar-square, which was attended by a numerous assemblage of guests of the first rank and talent.

Horticultural Society.—The anniversary meeting took place on Saturday, Sir Charles Lemon, Bart., in the chair. The reports of the council and auditors, which were read, stated that amongst the presents made to the society in the course of the year were some remarkable fruit trees from Syria, and some packets of seeds from the Court of Directors of the East India Company, New Holland seeds from Capt. Mangles, R.N., Sir George Murray, and Governor Gray. The distributions amounted to 8,355 plants, 45,405 packets of seeds, and 6,897 parcels of cuttings; 1,934 persons had visited the garden exhibitions, and 327 medals had been awarded. The receipts during the past year had exceeded the expenditure by £1,578 16s. 1d., but the bonded debt increased by the expenses in improving the conservatory, &c., amounted to £1,142 12s. 10d. The income was £7,450 13s. 11d. The ballot for the officers was then proceeded with, and the Duke of Devonshire was elected president.

The Percy Society.—The annual meeting of this literary association was held on Saturday. Its object is the printing and reprinting popular pieces of prose and poetry of an early date, including plays; and it appeared from the report of the council, that on the first day of every month since the body was instituted it has issued some work of curiosity and interest for circulation among the members, who contribute £1 per annum for the payment of the expenses. It has only been in operation about nine months, and it has already printed nearly 1,100 pages, including several collections of old ballads upon general subjects, upon naval affairs, upon London and its customs, upon public events in Ireland; besides a volume of the minor poems of LIDGATE, "Rowley's Search for Money," tracts upon marriage, originally printed by WYNKYN DE WORDE. The report of the auditors was most satisfactory, as it showed a balance in hand, notwithstanding the number of publications and the heavy expenses incident upon the first establishment of a society of the kind. The last publication of the year, which closed on the 1st inst., was "The Mad Pranks and Merry Jests of Robin Goodfellow" (in illustration of SHAKSPEARE's *Midsummer's Night's Dream*), from an antique copy in the library of Lord Francis Egerton, M.P.

Smallest Steam-Engine in the World.—We have been gratified with the sight of a model of a high pressure steam-engine, beautifully executed in silver, by Mr. John Mitchell, a working engineer, of Redruth, the cylinder and parallel motion of which stand within the circumference of a fourpenny piece! The cylinder is but one-tenth of an inch in diameter, the whole machine weighing but the eighth of an ounce, and a teaspoon full of water sufficing to set the machinery working (by crown wheel gear) with a force and velocity altogether amazing. There is a novelty in the construction of the slide valve, of which it would be difficult to give a description which would be intelligible to the general reader, but which evidences an ingenuity in designing, and a skill in workmanship, which we hope will be employed in future in works of greater magnitude and importance.—*West Briton.*

Geological Discovery.—In removing the superstrata, consisting of an upper thick deposit of sandy gravel, with the clay, shale, coal, &c., in the quarry a little west from the railway tunnel, near Falkirk, the section now exposed, about 25 feet deep, exhibits marks of powerful volcanic action. Above the rock the strata, in one part is thrown into nearly the form of a circle, for the space of 12 feet, from the centre of which there appears a radiation, until the combustible materials had exhausted their force; to the west the convulsion appears to have also been considerable. The appearance was just observed when about seven yards north from the place where the workmen are now engaged.—*Edinburgh Paper.*

American Exploring Expedition.—A New York paper has the following notice of the expedition sent by the United States to examine the north-west coast of America:—By the arrival of the ship *Lausanne*, we have dates from the exploring expedition up to December 2, 1840. The exploring squadron was to sail for the north-west coast, to survey the islands in that latitude; and it was expected they would return to the United States in May 1842.

Dr. Linth, one of the discoverers of the Phigaleian Frieze, now in the British Museum, and of the Ægina marbles in the Munich collection, died on the 4th of April at Stuttgardt, aged 50. He was the owner of a valuable collection of antiquities and pictures.

Effects of Lightning.—A Boston (United States) paper gives the following account of the effects and direction of lightning:—"A correspondent writing us from Dorchester, Lower Mills, informs us that the effects of lightning were wonderfully and awfully displayed in that village on Friday evening, the 2d inst. The shower was very severe in that vicinity, the lightning remarkably vivid, and, in several instances, followed almost instantly by the report—leading every one to suppose it struck near by. This has since been ascertained to be the fact. Two oak trees, from one foot to eighteen inches in diameter, standing about sixteen feet from each other, in a grove of woods owned by General Moses Whitney, were struck apparently by a horizontal shaft of the lightning, and from the height of fifteen feet to the roots were literally torn into basket stuff; the tops of the trees were thrown upon the ground entirely uninjured. From the base of the trees it spread in four different directions, two of which were from east to west, through two ledges of rocks, one of which is about three rods in thickness; a small rent is visible where it entered the ledge, and a very large one where it passed out—large fragments of rock having been broken off and thrown to a distance. From the ledge it passed on seven or eight rods, tearing up the ground, and forming a furrow varying from six to twelve inches in depth; where trees obstructed its path it went two or three feet into the earth, and came out again on the other side.

Queen Anne's Farthing.—At a sale of the late Baron Bolland's coins last week, a Queen Anne's farthing was sold for £9 10s. This is enough to set at rest the absurd reports so generally believed of large rewards being offered by the Government for one of these coins, for though rare, several of them are to be found in numismatic collections.

On the Occurrence of the Seeds of Pine Trees under Peat in Ireland.—At a recent meeting of the Linnæan Society, Mr. Babington, F.L.S., exhibited some fir-cones taken from beneath about ten feet of solid peat at Burrishoole, near Newport, co. Mayo, where they were accompanied by nuts of *Corylus Avellana.* He stated that the trees in that part of Ireland had all been destroyed for about 200 years, and that no individuals of either species now occur within very many miles, except a few planted of late years and far from this locality. Professor Don remarked, that the cones differed from either of the varieties of *Pinus Sylvestris* at present found in Scotland; and that they so entirely resembled those of the alpine form of that species, figured by Jaquin under the name of *Pinus Mughus*, as to leave but little doubt of their identity. He added, that he regarded *Pinus Pumilio* as only another form of the same species.

VARIETIES.

Accident to a Steam Vessel.—The *Royal William*, Margate steam-boat, ran foul of one of the piers of London-bridge on Saturday, owing to a temporary defect in the engines, which would not work; and the ship was therefore carried by the tide against the bridge. Her top masts and funnel struck the arch, and were carried overboard. Fortunately there were no passengers on board at the time.

Westminster Bridge.—In consequence of the rapid sinking of the arches of Westminster-bridge on the Middlesex side, the carriage-way has been blocked up from the public. Near £100,000 has been expended on the repairs of this bridge within the last ten years.

A Bavarian census has appeared of the population of its towns in 1840. Munich contained 106,531 souls, its garrison included, of which 74,303 are Catholics, 6,914 Protestants, and 1,423 Jews. Since 1839 the increase of population has been 2,095. Augsburg has 36,869 souls. Nuremberg, 46,824; Bamberg and Ratisbon about 20,000 each. Bavaria contains 30 monasteries and 30 nunneries. —*Augsburg Gazette.*

Discovery of Platina.—The *Port Philip Herald* states that Mr. Neville, of the Customs, has discovered a metal, supposed to be platina, in the fissure of a rock about 18 miles distance from Melbourne. It is heavier than iron, being 11 times more weighty than water. Several chemists have been attempting to analyse it, but without effect. Mr. Neville says that he could load several ships with it, in such quantities had he seen it. It is somewhat singular that Mr. Neville discovered the same metal, but not of so pure a quality, on the Sydney side of the country, some months ago, and as the chemists could not analyse it there, he sent it home to England, but has not yet heard of the result of his speculation.

Fire at a Railway Station.—The timber yard at the Bristol terminus of the Bristol and Exeter Railway caught fire last week, and piles of wood which had been soaked in tar for their preservation from rot were speedily consumed. It was with some difficulty the buildings at the terminus were saved. The damage is estimated at £10,000. The accident, it is said, will not occasion any delay in the opening of the line to Bridgewater, advertised for the 31st of May.

Suffocation by Carbonic Acid Gas.—A well-digger was suffocated on Wednesday, at Kensington, by attempting to descend a newly-opened well without taking the precaution to ascertain whether it was free from "foul air." He had not descended more than twelve feet from the surface, when the carbonic acid gas overpowered him, and he fell down on a platform in the well. A by-stander descended with a rope tied round his body, but before he could fix another rope to the man, he was rendered insensible, and was obliged to be drawn up; and before the man was liberated life was extinct. Had they thrown a few buckets of water down, to disperse and absorb the gas, the man's life might in all probability have been saved.

Fall of the Great Water-Wheel House at Greenock.—We lately noticed the erection of an immense water-wheel at Greenock, to be used as the moving power for propelling the machinery of a cotton mill. On Monday last the wheel house fell down, owing to the immense pressure of the arches of the vaults intended for the cotton stores. Mr. Grant, the manager of the mill, and a mason, were buried under the falling mass and were killed. Some gentlemen who were examining the mill at the time had a narrow escape.

Accidents in Blasting.—On Saturday, while two men were blasting the rock in the tunnel at Bletchingly for the South Eastern Railway, a barrel of gunpowder which had been uncautiously left at the bottom, exploded immediately after one of the blasts. The two men were in a skif half way up the shaft at the time, and were lifted up by the force of the explosion, but fortunately received little injury. Another man, who was looking down the shaft at the time, was blown into the air, fell down the shaft, and was killed.

The workmen, in excavating part of the site of the New Exchange, have found several Roman antiquities on the site of a large pond, 50 feet long, 34 feet wide, and 13 feet deep. Amongst these antiquities are a Roman wall and pedestal, articles of pottery ware, glass and glass vessels, lamps, coins, stiles and tablets for writing, and a strigel such as had been used in the baths of Pompeii. The latter is perfect. Sheep-bones and the bones and horns of stags have also been discovered in the excavations.

The President Steam-ship.—No tidings have been heard of this ship, and the hope of her return rapidly diminishes. It is supposed she foundered at sea during the severe gales which other ships which crossed the Atlantic last month experienced. The President cost £80,000; engines, 450 horse power, 2,100 tons.

Soap.—We find, from a Parliamentary return just published, that the total quantity of hard soap made in Great Britain from Jan. 5, 1840, to Jan. 5, 1841, was 159,220,068lb.; and that the total quantity of soft soap made during the same period was 13,535,856lb. The total quantity of hard soap exported from Jan. 5, 1840, to Jan. 5, 1841, was 22,004,075lb.; and the quantity of soft soap, 7,008lb.; the amount of drawback paid thereon being £140,745. The quantity of hard soap exported to Ireland was 9,930,108lb., and that of soft soap 187,244lb. The total quantity of foreign hard soap imported into Great Britain was 642 cwt., and the amount of duty received thereon £1,279 18s. 8d. The total quantity of foreign soft soap imported was 87 cwt., and the amount of duty received thereon £203 2s. 6d.

Hops and Malt.—The total number of acres of land in England and Wales under the cultivation of hops in the year 1840 amounted to 44,805; and the duty on hops of the growth of 1840 amounted altogether to £62,253. The quantity of British hops exported from Great Britain to foreign countries from the 5th of January, 1840, to the 5th of January, 1841, was 923,881lb.; the quantity of foreign hops imported into the United Kingdom in the year ended January 5, 1841, was 11,966lb. The total number of quarters of malt made use of between the 5th of January, 1840, and the 5th of January, 1841, in the United Kingdom, amounted altogether to 5,337,107, out of which 3,564,411 were used by brewers and victuallers, and 420,858 by retail brewers.

The Currency Committee.—The Committee on Currency propose to examine two Scotch bankers, after that two Irish bankers, and will then determine the future course they intend to pursue. In the meantime the Scotch banks have taken the alarm, and sent a deputation to London, consisting of seven bank managers, to oppose any change in their system.—*Journal of Commerce.*

Sheep and Lambs' Wool.—By a Parliamentary return, we find that the total quantity of sheep and lambs'-wool imported into the United Kingdom in the year 1840 was 49,448,114 lbs. (including the Isle of Man), of which 21,812,099 lbs. were imported from Germany. The total quantity of British sheep and lambs'-wool exported from the United Kingdom in the year 1840 was 4,810,387 lbs., and the total quantity of woollen and worsted yarn, 3,796,644 lbs. The declared value of British woollen manufactures exported from the United Kingdom in 1840 is stated by the above return to be £5,327,853.

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THE
INVENTORS' ADVOCATE,
AND JOURNAL OF INDUSTRY;
A WEEKLY BRITISH AND FOREIGN MISCELLANY OF
SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

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LOSS OF MOTION BY ROTATION.

In consequence of a discussion which arose in former numbers of our journal,* on the nature and effects of what is termed centrifugal force, we were induced to consider more particularly the cause of a double circular velocity producing a quadruple centrifugal power. In the course of these investigations we were led to conclude that the rotation of bodies must necessarily occasion a loss of power. This opened a new view of the laws regulating revolving bodies, accompanied at first sight by startling consequences that for a while induced us to think there must be some error in the conclusions at which we had arrived, though our premises seemed indisputable. If, for example, the rotation of bodies be attended with a constant loss of original power, it appeared at first a natural inference, that the velocity of the planets in their orbits, and the rotation of the earth on its axis, must be gradually diminishing and that they must ultimately cease to move, and be all absorbed by the superior attracting influence of the sun. The observations of astronomers, however, contradicted such an assumption, therefore we were about to abandon our theory, until a further consideration of the subject removed the objections founded on the motions of the heavenly bodies, and confirmed our original opinions.

We now propose to show in what respect the revolutions and rotations of the planets in their orbits and on their axes differ in their effects from that of the rotation of bodies on the surface of the earth; so as to endeavor to remove from the minds of our readers those objections to the theory, that rotation is attended with loss of motion, which at first impressed ourselves. In the first place, however, it may be as well briefly to re-state the grounds on which we found the opinion, that power is lost by rotation, independently of loss by friction.

It is an admitted law of motion, that the impulse given to all moving bodies is in straight lines, and that they must persevere in that course in which the motion is communicated unless deflected from it by some other force. It is also well understood, that when any body in motion is acted on by two or more forces, so as to change its original direction, a loss of power is sustained in proportion to the divergence from the former course. For instance, when a ball is struck by two equal forces acting at right angles to each other, it takes a direction exactly between the two, and the result of the motion communicated bears the same proportion to the original forces that the diagonal of a square bears to two of its sides. The loss of power consequent on this divergent action of the two forces is therefore about three-tenths of the whole. The same effect, we contend, must be produced when the motion of a body is changed from a straight line into a curve, and that the loss of power by moving a body in a circle is in the proportion that the circumference of the circle bears to the square in which it may be described; that is to say, nearly as 11 to 14. We must refer to our former numbers for the illustrations and examples by which we endeavored to establish this position. Our present object is merely to state what that position is, and to show that this view of the loss of power by rotation is not inconsistent with the constant and regular revolutions and rotations of the heavenly bodies.

In the first place, one great point of difference between the circumstances of the rotation of the earth and the rotation of bodies on the earth's surface is, that in the former case there are *two acting forces* engaged, whilst in the latter, there is *only one*, the other being a passive, or resisting, force. For example, in addition to the original impulse which communicated the rotary motion to the earth in its orbit, there is the aggregate attraction of the whole mass, which is constantly drawing the matter on the circumference of the earth towards its centre, and thus deflecting the motion from a straight line. In a body rotating on the earth's surface, however, the only acting power is the impulse which communicates the motion; for the force of cohesion which holds the particles of the body together is only a resisting force, which compels the different parts to revolve round the common axis. The attraction of cohesion is active in holding the different particles together, but it does not exert any general attraction on the whole body drawing the particles towards its centre, like the force of gravitation.

The difference in the effects produced where two acting forces are in operation, contrasted with those of one acting and one resisting force, are best exemplified in the revolution of the planets in their orbits, though the same principle is applicable to the rotation of the earth. When any heavy body is made to revolve round an axis, on the earth's surface, it has a constant tendency to fly off in a tangent to the circumference of the circle it describes. This it is unable to do, being held firmly by the cohesive attraction of the substance to which it is attached, which acts as a resisting force, and deflects the motion from a straight line into a curve. The velocity of the rotating body is thus diminished by its being compelled to describe a circle with a fixed radius, and the same resisting force is constantly acting to reduce the velocity and bring the body to rest. The planets moving in their orbits are not thus restricted to an undeviating course by an unyielding resistance, for there is no resisting force to diminish the velocity originally communicated. It is true, they are compelled by the sun's attraction to deviate from the straight line to which their motions constantly tend, but in describing their curvilinear course they can take a wider circuit, so as to preserve their original velocity. The effect of the attractive power of the sun is not to retard the motion, but merely to bend it, and there is no resisting force acting on the planet to circumscribe its path within the range of its velocity. We thus perceive why the velocity of the planets' motions in curves may continue the same, though curvilinear motion in solid bodies on the earth's surface cannot be communicated without diminishing the original impulse. But there is also another important difference arising from the energy of two active forces instead of one. The force which deflects the motion of the planets from a straight line, is derived from the attractive power of the sun; but in the case of rotating bodies, there is no second acting power. The force by which the body is deflected is derived from the moving power alone; which thus communicates motion in a straight line, and also deflects it into a curve. It is this amount of resistance required to deflect the motion that we contend is power lost.

The constant rotation of the earth on its axis, is preserved by the same two active energies which keep the planets in their orbits. The rotating mass cannot, indeed, extend the circuit of its revolution like the planets in their orbits; but the same composition of attractions which keeps the latter in their orbits, operates also to counterbalance the tendency of the solid mass of the earth to deviate from its circle of rotation. It is

* Nos. 33, 39, 40, and 43.

admitted that the earth at the time of its creation was a fluid mass. It was, therefore, free to assume any shape impressed on it by the combined centifrugal and centripetal forces. The oblate spheroidal shape of the earth is the result of the action of those forces on the fluid mass of matter. The greater diameter at the equator represents the extent to which the centrifugal force overcame the centripetal, in adjusting the balance of their respective powers. We may reasonably presume that the same adjustment of forces continues, and that if the earth were again to become fluid, its shape would not be changed. It makes no difference, therefore, in the action of the two forces, whether we regard the earth as a solid or as a fluid body. The attraction towards the centre would be the same in either case, and as it was sufficient at the time of the creation to deflect the motion of the fluid mass, which was tending to fly off in tangents to the circumference, into a curve, and to make it assume its present shape, it must also be adequate to deflect the motion of the same mass when afterwards solidified.

We thus perceive that the constant and regular rotations of the heavenly bodies are not inconsistent with, but, on the contrary, are confirmatory of, the theory of loss of power by rotary motion in bodies on the earth's surface. In the one case there is a second acting force constantly operating to deflect the straight motion into curves; whilst in the other, there is only one power exerted, and the deflection of the motion is produced solely by the resistance offered to the exertion of that power. If, therefore, constant and regular rotation can be produced only by the exertion of two independent acting forces, the same effects cannot be produced in the absence of one of those forces. We must hence conclude that the power required to deflect the motion in rotating bodies on the earth's surface must be abstracted from the only acting force which gives the impulse. The motion of the heavenly bodies, consequently, affords additional confirmation of, instead of being opposed to, the theory of tho loss of motion by rotation.

THE PRESERVATION AND COLORING OF WOOD.

The process of M. Boucherie for preserving wood from decay, and also for causing the minute fibres to be penetrated by coloring substances, so as to alter the appearance of the wood, has been put into operation in Brussels. The results of some of his more recent experiments are given in the *Fanal*, from which we make the following abridgment :—

The plan of soaking timber in any preservative fluid after it has been cut down for some time, is asserted by M. Boucherie, and those who advocate his process, to be ineffective. It is said to be impossible, by mere soaking the timber, after the vital influence is extinct, to drive out the sap, and replace it by the solution. The process, in somo cases adopted, of producing a vacuum in the vessel, and then allowing the pressure of the atmospheric air to force the liquid in which the timber is soaked into its pores, is attended with expense and inconvenience, and is also said not to be so effectivo a means of expelling the sap and penetrating the fibres of the wood, as by the natural inhaling powers of the tree before the vital principle has ceased to operate. M. Boucherie, after considering the practical difficulties that attended the application of his former process, owing to its being limited to certain months of the year, has found the means of making the preservative liquids penetrate the wood even in winter, which differs from his first mode of availing himself of the vital principlo of the trees, and is found to be economical, speedy in its operation, and permits the liquids to penetrate all woods in logs, or when shaped for the purposes to which it is to be applied.

This process is solely applicable to wood newly cut, and which has been divided into pieces. The logs must be placed and kept in a vertical position, and fit into a kind of reservoir at their upper ends; into which reservoir the liquid is put, which it is required should penetrate the fibres of the wood. In the great majority of cases, the liquor employed quickly filters through, and penetrates the capillary tubes of the wood; and the sap almost simultaneously runs out; but in some woods, which contain large quantities of gas, the running out of the sap does not commence until the gases are expelled, and then the sap flows out without interruption.

The operation is finished when the liquid which flows from the lower ends of the pieces of wood is exactly similar to that in the reservoir. In the course of the experiments made by M. Boucherie in this mode of penetration, he has remarked a great number of very curious circumstances, which are thus enumerated.

1st. It is easy to extract the sap by thousands of litres from almost all kinds of wood. This operation is performed without cost, and in a very short time. In a single day, with the assistance of two men, he has extracted 4,850 litres of sap from seven trees.

2d. In this manner he is enabled, not only to extract from woods the sugary and mucilaginous matters which they contain, but also their resinous and colored juices. To effect this it is requisite in the first place to impregnate the trees with a liquid which will dissolve those juices. It, however, requires some time before these artificial saps thus formed, become charged with those substances. In both cases this sap may be made use of very advantageously.

3d. The sap from tho circumference of the tree, and that from its centre, present some differences. The greater or less height of the trunk from which it is drawn, the age of the tree, and the time of year, have an influence on the composition of the sap.

4th. In the greater number of cases, the sap contains only some thousandth parts of solid matter, though the wood contains many hundredths of soluble matter. This known fact points out very interesting researches in vegetable physiology; nothing can more clearly demonstrate the vascularity of the ligneous system.

5th. Wood contains different proportions of gas according to its kind, the age of the tree, and the season of the year. It is known, that in some instances these gases amount to the twentieth part in volume of the cube of wood.

6th. In the course of these experiments it has been ascertained that the contractility of the fibres of the wood differs under the influence of different agents; and that whilst one kind can be completely penetrated by the liquor A, which was neutral, and by the liquor B, which was astringent, another kind only admitted the liquor A to pass through its fibres. This consideration becomes of great importance in practice.

7th. The lighter woods are not those which are the most easily penetrated, as might have been supposed. Tho poplar resists more than beech, elm, &c., and willow much more than the pear, maplo and plantain; but the resinous woods are those which offer the most resistance to the infiltration of the liquids employed.

NEW PROCESS FOR DYEING WOOL.

BY M. CH. KOEBU.

I propose in the first instance to make uso of bi-chromate of potass as the mordant or agent for fixing the colors used in dyeing wool, in order to procure more permanent tints and brighter colors at less expense. In fact, according to my own experience, this salt renders colors more immovable in woollen cloths than the mordants usually employed, such as sulphate of iron or copperas, or the double sulphate of alumine and potass, or alum. The great affinity that bi-chromate of potass possesses for woollen as well as for coloring substances, is the reason why a comparatively small quantity of that salt is requisite in order to make the woollen take the dye. I have found that 1 kilogramme of bi-chromate of potass is equal to 3 or 4 kilogrammes of copperas or alum. Besides, the color produced by the salt of potass offers a greater resistance to alkalies and to the air, as well as to the operations of rinsing and squeezing, to which woollen cloths are subject in the process of the manufacture. Hence it follows, that smaller quantities of dyeing materials are requisite to produce a desired effect than are employed according to the usual process; because the dye adheres better, and there is less of the material taken away and lost in washing with soap. In fact, the fibres of the cloth when bi-chromate of potass is used, are less injured than they have hitherto been by the acids contained in the alum and the copperas; on the contrary, the cloth becomes softer, is easier to rinse, to wash, and to press, and consequently the same quantity of wool produces more cloth of superior quality than can be produced in any other way. I have also observed that bi-chromate of potass is particularly successful in preparing the wool for the reception of certain dyes; especially for fixing logwood and fustic, whilst it has a less efficacious effect on red woods and madder.

As in my method of applying bi-chromate of potass all the dyes that are in general use are employed, as every shade or gradation of shade requires a proportionate difference in the ingredients, in short, as there is a very material difference in the qualities of the coloring materials used, to such a degree that double the quantity of one is requisite to produce a certain effect produced by another, it is almost impossible for me to determine the various proportions in which the bi-chromate should be used with each. It will be understood, also, that the weight of bi-chromate requisite varies according to the quantity of the dye which the wool receives; but in general I use 3 kilogrammes of bi-chromate of potass to dye 100 kilogrammes of washed wool; I sometimes add to it 2 kilogrammes of tartar, and in the liquid produced by the solution of these salts, I boil the wool for an hour and a half. On the following day I apply the color bath prepared with the quantity of dye requisite to produce the shade I wish to obtain.

In the second place, I succeed in obtaining green colors quite capable of resisting acids, alkalies, and the exposure to the air, by dyeing the wool when in fleece with blue, in manufacturing the material thus dyed into half dressed cloths, and then dyeing it in yellow in the piece, in order to obtain a very permanent green; resembling in appearance a woollen stuff of dyed green, but much more permanent.

The manner of dyeing yellow is too well known to require any description of it. Any kind of yellow dye may be used for this purpose, but I give the preference to fustic on account of its durability. In this process where the material which is half dyed has to be dipped in a bath of yellow dye, in order to fix the color I make use of chlorhydric acid saturated with tin, to which I add a quantity of water necessary to give the fluid the specific gravity of 1·2612. I take from 6 to 7 kilogrammes of this solution for 100 kilogrammes of stuff, independently of the usual quantity of alum and tartar. This solution cannot be advantageously applied to spun wool which has not been woven, because it would not admit of the use of soap, and consequently could not be pressed.

In the third place, I propose to make use of soda and bran, for dissolving the indigo in the vessels used for dying wool, in order to fix that coloring matter more effectively and at less expense than can be done by the use of logwood, madder, and

ran, that have hitherto been generally adopted. The following is the manner and proportions in which I use soda to effect this object.

In a vessel of the size of two metres, I heat the water to 50 degrees of the centigrade thermometer. Then I throw into it 32 kilogrammes of bran, 17 kilogrammes of common soda, which contains about 23 per cent. of dry carbonate of soda, and 2 kilogrammes of indigo. I then proceed in the same manner as usual, adding to it the regular quantity of lime. Afterwards I bring the vessel to 43 deg. and 48 deg. centigrade, three or four times a day, without shaking it. In the evening I raise the temperature again to 50 deg., adding 2 kilogrammes of lime, 3 kilogrammes of bran, and 2·5 kilogrammes of soda, with the quantity of indigo that I consider requisite. On the following day and in the evening after this addition has been made I heat the bath in the usual manner, the temperature indicated being above 50 deg. If the bath has been used during the day, I add every evening the quantities of lime, bran, and soda necessary to preserve it in a proper state, even without adding indigo. My vessel being kept by this means in a state fit for use, I add from time to time, and in the evening, all the indigo to be used on the following day. It is impossible to define the quantity of this substance that it is requisite to add in this manner, for it may vary from 250 grammes to 12 kilogrammes, according to the hue intended to be produced on the following day.

After having proceeded in the manner I have explained from eight to ten weeks, I do not empty my vessel, but I only take away the sediment that is formed; and with the liquid of the old bath I form another by the addition of 6·5 kilogrammes of bran and 5 kilogrammes of soda, with as much chalk and indigo as is necessary. As the chalk is intended to moderate the fermentation produced by the bran, it is impossible to fix the quantity of this material that ought to be put in. I generally use the quantity that I consider necessary to limit the fermentation to the point when the indigo becomes simply disoxygenised and to stop immoderate fermentation, which would be injurious to the process. In making use of soda in my vessels the same rules and practices must be observed as with ordinary vessels, excepting that neither wood nor madder is used; nevertheless, the effect can be produced with wood, with madder and bran. I prefer using nothing but bran with soda.

The bath into which I put the soda ought to be perfectly yellow, that is, the indigo should be entirely free from oxygen. When soda is made use of that contains 46 per cent. of dry carbonate, instead of common soda, only half the quantity is required to produce the same effect. Pearlash may also be used, if the price admits, and oatmeal instead of bran.

THE COLLIERIES AND IRON MANUFACTURES OF BELGIUM.

The principal mineral products of Hainault, of the provinces of Liége, Namur, Luxemburgh, and Limburgh, are coal and iron. The coal mines, which since 1830 have experienced considerable diminution in the amount of their produce, owing to the loss of the means of export towards Holland, and the depression of other branches of industry, attained the height of their prosperity in 1837 and 1838. In 1836, the coal pits where that mineral was extracted amounted to 457, and the number of different mines was 250; there were 31,190 workmen employed, and the produce amounted in value to 32,000,000 frs.

In 1838, 135 coal mines were in work in Hainault, and there were 19 not worked. The number of men was 25,241, and there were 277 steam-engines employed, either in working the mines, in draining them, or in sinking new shafts; the quantity of coal extracted was 24,159,094 hectolitres.

The coal from the pits at Mons are sent partly into France by canal; the remainder go to Brussels by the Charleroy canal.

The coals from Charleroy supply the great centres of industry, the blast-furnaces, the glass-houses, the refineries, &c., and a great portion of them also goes into Brabant, and between the Sambre and Meuse.

On the 15th February last the number of mines in work in the whole kingdom of Belgium was 225, and 48 out of work; and in 31 other places preparations were making for opening new pits.

The following is a statement of the quantity of coals imported and consumed, and the quantity of coals exported, the produce of Belgium.

	IMPORTATIONS. kilog.	IMPORTATIONS. frs.	EXPORTATIONS. kilog.	EXPORTATIONS. frs.
1831	782,452	11,736	469,514,528	7,042,718
1832	5,870,783	88,062	1,289,628,707	19,344,431
1833	7,995,272	119,929	579,792,091	8,696,881
1834	11,145,689	167,185	647,540,012	9,713,101
1835	8,966,525	134,498	695,586,791	10,433,802
1836	13,015,202	195,228	773,611,516	11,604,173
1837	16,911,033	253,665	789,083,603	11,836,254
1838	23,117,726	346,765	775,534,545	11,663,018
Annual Average..	10,975,582	164,633	752,536,474	11,288,074

The principal foreign market for the coals of Belgium is France; in 1838 one-half the amount of exportation was sent into that country.

In 1827 there were in Belgium 23 blast furnaces worked with coke, 66 with charcoal, and there were 20 blast furnaces building, to be worked with coke. The amount of produce in 1836 was 135,000 tons of cast-iron, estimated in value at about 27,000,000 frs.

Foreign trade in unmanufactured iron is not of much moment; the average of the imports and exports for the five years, 1834-38, were, imports, in value, 548,072 frs.; exports 856,059 frs.; the amount in 1828 was less than in the preceding year.

The average of the same five years exhibits an importation of iron castings to the amount of 32,964 frs., and an exportation of 37,835 frs.; of forged iron in bars and rods, 127,596 frs. of imports; 21,214 frs. exports; of sheet iron, stoves, &c., 147,919 frs. imports, and 169,863 frs. exports. From this it appears that Belgium still receives a larger amount of forged and rolled iron than she exports. In iron manufactures, however, comprising sheet-tin and steel, the average importations of the five years amounted to 1,042,268 frs.; whilst the exports of the same articles reach as high as 2,785,502 frs. The comparison of the importation and exportation of machinery is equally favorable to Belgium; the average of the imports being 2,221,353 frs., and the exports 3,430,191 frs.

The manufacture of arms has greatly increased since 1830. This branch of manufacture is principally carried on at Liége. The average imports for the five years ending in 1838 were 92,993 frs., and the exports amounted to 3,016,838 frs. The manufacture of nails, which is an important branch of manufacture in the provinces of Hainault and Liége, exhibits also a favorable result for Belgium, as the imports amounted to only 10,844 frs., whilst the exports were raised to 2,263,653 frs.

THE MUTUAL DEPENDENCE OF AGRICULTURE, MANUFACTURES, AND COMMERCE.

We have on several occasions urged the importance of considering the three branches of national industry as intimately connected and dependent on each other, and that injury cannot be inflicted on the one without re-acting on the others. The following article which promulgates similar views is translated from *L'Association Industrielle de la Gironde*, and is valuable not only from the clearness with which this connection is pointed out, but as indicating the opinions of well-informed men even in the agricultural departments of France.

"If the object and ultimate condition of society were to be war, it would be absolutely superfluous to attend to the organization and development of industry. The governments and the people would each fulfil their mission, the one by raising and the other by supplying armies; and social advantage would depend on the success of conquests and the results of plunder. But if war be only a temporary necessity,—the still remaining effect of a cause which is gradually subsiding—and if the march of civilisation leads us imperceptibly towards a state of peace, it leads us with equal force towards the promotion of industry, which is the consequence and living symbol of peace. This explains the tendency of all enlightened minds to leave the unproductive struggles of party spirit to investigate those important industrial questions, in which the future condition of society is involved.

"By industry we mean not only that portion of the labor of man which consists in giving to a natural production, to a raw material, the change of form intended to increase its value by increasing its utility; this labor, which strictly speaking is the work of the manufacturer, is doubtless one most indispensable to the well-being of society and to the development of its natural riches; but it forms merely a fraction of the complex idea which is concentrated in the general expression of industry. Industry may be divided into three principal branches, each of which is so important and so indissolubly connected with the two others, that it would be impossible to conceive their separation, or the destruction of any one of them, without the entire ruin of the whole social economy.

"As in the progress of industry the labor of man must necessarily be employed on the raw material, it is necessary in the first instance that he should adopt the means of procuring it. Now it is nature which provides him with it; it is the earth which contains it, and promises it to him as the reward of his efforts. The application and direction of these efforts comprises what we term *agricultural industry*.

"But if a portion of the produce resulting from this branch of industry is of a nature to satisfy the immediate wants of man; there is also a portion which requires particular labor, and necessary changes. The intelligence which directs this labor, united to the power which accomplishes it, is termed *manufacturing industry*.

"Again, the raw material once produced or altered in its form, cannot remain inert and unemployed in those places where this transformation has been effected. It must be carried away in order to be placed at the immediate disposal of the consumer. The branch of industry which produces this approximation, whether it is effected between the production and consumption of the same country, or whether its object be to supply another country either with the productions of nature or manufacturing produce—this constitutes *commercial industry*.

"In entering into a separate investigation of the particular functions of these branches of industry, it is certainly difficult to determine which exercises the most direct influence on the economy of society; and still more difficult is it to conceive that there are some writers who have pretended to demonstrate that one branch is more deserving of encouragement than the others. The truth is, that they all deserve equal encouragement, since it would be impossible that any could be neglected without inflicting a serious blow on the social system.

"How long would the cultivation of wheat and flax continue if a class of workmen were not

always in readiness to couvert them into flour or thread? What would become of the manufacture of flour or thread if there were not afterwards a class of men in readiness to convey each of these productions to the consumer? What would become even of this last branch of industry without the cultivation of corn and flax, and without the manufacture which has produced so material a change by rendering them fit for consumption.

"These three branches of industry are thus closely connected and bound together; nor will it be useless to refute the prejudice which pretends to make a distinction in their importance, and to classify their utility as a means of classing the proportionate encouragement that ought to given to each.

"It is in favor of agricultural industry that it has been thought requisite at different periods to call for the almost exclusive protection of the government. What has already been stated is sufficient to point out the false principlo on which this is founded. Who can deny that it is proper and useful to encourage agriculture? But who can deny, also, the equal propriety and utility of encouraging commerce, which secures the disposal of its products; and of the labor of the manufacturer, without which the greatest part of this produce would be of no use? Where shall the protection given to agriculture commence and where shall it stop? Who shall determine the precise moments when the labor ceases to be agricultural, and becomes manufacturing? These two branches of industry depend so entirely on each other that in some productions they are carried on by the same workman. Thus, to cite but one example, drawn from our own indigenous production; is it not true that when the grape is gathered from the vine, the agricultural labor is finished—and yet is it not the agriculturist himself who effects the transformation of the material by means of a series of operations which converts it into liquid? The same agriculturist very frequently exports this liquid into other countries, and thus reunites in his own hands the three functions of that trinity which forms the basis and character of all social economy."

BRITISH PATENTS.

ENGLISH EXPIRED PATENTS.

John Brown and William Duderidge Champion, of Bridgewater, merchants, *for a composition or substance which may be manufactured or moulded either into bricks or into blocks of any form, for building; and also manufactured and moulded to, and made applicable for, all internal or external ornaments, architectural purposes, and for various other purposes,* May 5.

David Bentley, of Eccles, bleacher, *for an improved carriage wheel,* May 8.

Errata.—In No. 90, the specification of James Fitt was by mistake placed under the head of "Enrolment Office," instead of the "Petty Bag Office," and in No. 92, the like mistake has occurred with the specification of Thomas Clark.

In the monthly list of patents sealed, published in No. 75, the patent of Mr. Stubs, of Warrington, for improvements in screw-wrenches, and spanners, was incorrectly printed "screws, wrenches," &c.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(Continued from page 294.)

Richard Farger Emmerson, of 38, Manor-place, Walworth, Surrey, gent., for *improvements in applying a coating to the surfaces of iron pipes and tubes,* May 3.—This invention relates to the coating of the surfaces of iron and cast-iron tubes with tin, or an alloy of tin.

The surfaces of the tube to be coated are first cleansed by immersing them in suitable pickling liquor, composed of two parts of muriatic acid to three parts of clear water, allowing the tubes to remain in it till the scale comes off easily by scouring with sand. The surfaces of the tubes being thus cleansed, they are in a condition to undergo the next process, which consists in immersing them in a bath composed of muriatic acid and zinc or spelter, in the proportion of three ounces of zinc to each pint of muriatic acid; the tubes remain in this bath only as long as will ensure its acting on them both inside and out. The tubes are next to have a quantity of powdered rosin placed within them, and dusted over their external surfaces, so as to cover both surfaces as completely as possible. The tubes are now passed into a vessel containing tin, or an alloy of tin, in a melted state, conducting the tubes end forwards through the melted metal, so as to obtain a current of the metal through them, by which means the tubes so treated will be coated with tin, or its alloy. The surfaces of the tubes are wiped with tow, on being removed from the melted tin.

Claim.—The coating of the surfaces of iron and cast-iron tnbes with tin, or an alloy of tin.

John Rapson, of Limehouse, Middlesex, millwright, for *improvements in paddle-wheels for propelling vessels by steam or other power,* May 3.—These improvements consist in applying hollow vessels (which the patentee prefers to be made of copper) to paddle-wheels, in place of the float-boards or paddles now employed, which hollow vessels being immersed in the water by the rotation of the wheels will offer greater resistance to the power of the engine, and thus cause the vessel to be propelled more advantageously, and the hollow vessels in passing the perpendicular when under the water will by their levity tend to rise to the surface of the same, thus requiring less of the engine's power heretofore requisite for raising what is called "back water."

Claim.—The mode of constructing paddle-wheels, by applying hollow vessels in place of the float-boards heretofore used.

John Clarke, of Islington, Liverpool, plumber and glazier, for *an hydraulic double action force and lift pump,* May 5.—The patentee claims as his invention the water-chamber, of whatever form it may be made, and whether it is applied to pumps for mines, fire-engines, ships, or any other of the purposes for which forcing-pumps are ordinarily used. He also claims the casting the barrel of the pump and the side chamber in one piece, whereby the expense and risk of leakage, which would be occasioned by constructing the side chamber of a distinct tube or pipe, and connecting it by means of rivetting, soldering, or any other mode, with the barrel of the pump, are avoided.

This invention consists in the application to force-pumps of a water chamber, of any desired form, and which may be made of brass, iron, or any other metal, being divided longitudinally into two compartments by a feather, which is cast in one piece with it; so that when the water chamber is fastened by screws to an upper and lower hood (with leather or other soft material interposed between the joints in the usual manner), it will be rendered perfectly secure and water-tight, whilst by loosening the screws, the upper hood may be removed, and the discharge valves, which are attached to the upper side of the water chamber, may be examined, cleaned, and repaired; at the same time by the removal of the lower hood to which the suction valves are attached, those valves also may be examined, cleaned, and repaired.

This invention also consists in casting the barrel and the side chamber, that communicates between the water chamber and the upper part of the barrel, in one piece.

Pierre Mathew Mannoury, late of Paris, but now of Leicester-square, merchant, for *improvements in wind and stringed instruments* (being a communication), May 5.—This invention consists in combining in one instrument (which is in shape like a guitar) the power of giving out separately or all together the tones of a violin, clarionet, and violoncello, by means of a double bellows, the wind from which acts upon a number of keys, when the same are moved by the performer, and gives forth the desired sound. The keys are moved by the performer passing his fingers over a series of buttons on the handle of the instrument, which are connected by wires or cords with the keys.

These keys are boxes, having a suitable passage at the bottom, for the admission of air from the bellows, and provided with a valve at the top, which is attached by means of an elbow lever to one of the cords before mentioned. On the cord being pulled, by the performer depressing one of the buttons, the elbow lever opens the valve, the air escaping from which gives forth the sound.

Henry Hind Edwards, of Nottingham-terrace, New-road, Middlesex, engineer, for *improvements in evaporation,* (being a communication,) May 5.—This invention relates to certain modes of improving the application of heat so as to obtain greater results from a given quantity of fuel.

Before describing the invention, it will be necessary first to point out the principle of action, and then to explain its application.

It is well known that a liquid when heated to its boiling temperature under the pressure of the atmosphere will emit steam; now if this steam is taken and forced into a worm or other apparatus, and the steam is compressed until it acquires a pressure of about 1-12th of an atmosphere greater than its pressure when occupying the space in the evaporating vessel, between the cover and the surface of the heated liquid, it will become entirely condensed by giving up its latent heat to the surrounding heated liquid, and that at the rate of about three pounds of condensed steam per hour for every square foot of the heating surface of the worm. The steam produced by the evaporation of the heated liquid will thus, by its condensation, return to that liquid all the caloric absorbed from it, as latent heat, by the steam generated, and the evaporation of the heated liquid may thus be continued with the assistance only of the power requisite to compress the steam in the worm and the restitution of that quantity of caloric which may have escaped from the apparatus by leakage or radiation.

In order to carry the principle out practically, the patentee uses an evaporating pan, with an internal worm or series of pipes, offering a sufficient heating surface, and closed by a cover, the edge of which dips into a surrounding trough containing water or other liquid, and this cover is provided with a valve, so regulated that it will open as soon as the internal pressure becomes greater than that of the external atmosphere. To this evaporating pan is applied a pump for the purpose of drawing off the steam as fast as it is generated from the surface of the heated liquid in the pan, and force the same into the worm or other apparatus contained in the liquid; the worm having at its lower extremity a valve to regulate the escape of the condensed steam, being loaded so as to determine an internal pressure of from 1-12th to 1-6th of an atmosphere. The condensed steam that escapes will serve by means of another worm in a separate vessel to heat the liquid to be evaporated, previous to its introduction into the evaporating pan.

The patentee likewise describes another evaporating apparatus for carrying out the principle.

George Gwyne, of Duke-street, Manchester-square, gent., for *improvements in the manufacture of candles and in operating on oils and fats,* May 5.—The specification of this patent was published in our 61st number, the present patent being merely for the colonies.

George Halpin, jun., of Dublin, civil engineer, for *improvements in applying air to lamps,* May 7.—Claim first.—The application of a blast or current of air (whether produced by a blower, or condensation, or otherwise) on the principle of adding a blast of air, in addition to the ordinary draft of air, produced by the burning of a lamp.

Claim second.—The particular mode of applying the blast of air as a hollow cylinder, acting vertically on the inside of the flame without causing deflection.

Claim third.—The form and application of the separate passage for the blast or current of air, through the burner, still leaving the centre space open, as in the ordinary argand oil lamp. Also the invention of the separate passage, whether for applying a blast of atmospheric air in its ordinary

state, or mixed with gas, or for applying pure oxygen or other gas to the flame of the lamp.

These improvements consist in placing an additional tube within that usually forming the inner casing of an argand lamp, and through the passage thus formed between the two tubes a blast or current of air is impelled, which acting on the flame in a vertical direction greatly increases its brilliancy.

The blast of air is supplied by means of a tube from a blower or fan, worked by any suitable contrivance, or the blast of air may be supplied from a reservoir in which it is condensed, or in any other way.

EDWARD DODD, of Gloucester-place, Middlesex, musical instrument maker, for *improvements in pianofortes*, May 7.—These improvements are shown as applied to upright pianofortes.

On ths upper or top rail are fastened the tuning and other pins, at front and back, for the two ends of each of the strings to be fastened to, and on the under surfaces of the lower rail are applied a series of pulleys on suitable axes; such axes being sustained by bearings affixed to the lower rail, and retained in their places in the bearings by means of straps; the pulleys are kept separate by washers.

The mode of applying the strings is as follows:—One end of each string is first fastened to the front pins on the top rail, from thence the strings descend and pass round the pulleys on the lower rail, up to the top rail again, where they are fastened to the back pins, by which means the strain on either side of the frame is rendered equal.

Claim.—The mode of applying strings to pianofortes, whereby the strain thereof is rendered equal, or nearly so, on both sides of a frame.

CHARLES DE BERGUE, of Blackheath, gentleman, for *certain improvements in machinery for making reeds used in weaving*, (being partly a communication,) May 7.—These improvements consist in a new arrangement of machinery, by which the dents of the reeds can be set with greater regularity and firmness than when set by hand in the usual manner.

Claim first.—The general combination and arrangement of the improvements herein described for the purpose of making reeds used in weaving.

Claim second.—The arrangement and construction of the cutter and driver, by which the dent or portion of flattened wire of which the reed is constructed is cut off, and forced into its proper position, in a manner similar to the action of the hand-reed maker.

Claim third.—The principle of cutting off the dents as they are set in the machine, by means of a cutter which does not revolve round the ribs; whether the cutter is formed of the edge of the driver, or by a prolonged edge of the tube.

The two pairs of ribs into which the dents of the reeds are to be set are passed through tubes, and are held at each extremity by clamps; these tubes are each provided at one end with a piece of hardened steel, which the patentee terms a cutter and driver, and are attached to a "headstock" or carriage, moving freely in a horizontal direction on the bed of the machine. To this carriage an alternating motion is given by suitable gearing from two treadles, which are worked by the feet of the operator.

The pitch on the bands used in reed-making is kept in a soft state during the process by a small quantity of lighted charcoal, supported immediately under the two bobbins on which the bands are wound, or by any other means.

The operation of making the reed is as follows:—The operator is seated opposite the two treadles, with a foot on each, and the flattened wire of which the dents are formed being supplied from a reel or coil by hand, is first introduced through a guide, and between the first pair of ribs, thence through a second guide and between the second pair of ribs, where it arrives at a stop; at this part of the operation the operator depresses one of the treadles, by which means two flyers carrying the bobbins on which the pitched bands are wound are caused to revolve, and thus wind each band once round the rib to which it belongs; the operator then depressing the other treadle imparts a rectilinear alternating motion to the tubes before mentioned. By this motion the flattened wire or dent, which has been passed through the ribs by hand, is cut off by the edge of the driver or cutter coming in contact with the edge of the guide through which the dent was first passed. The drivers now proceed to force the dent home to its proper position, along with the last coil of pitched band, and then return to their former position to admit of the next dent being placed between the ribs as before described.

WILLIAM CROFTS, of Radford, Nottingham, machine-maker, for *certain improvements in machinery for the purpose of making figured or ornamented bobbin-net, or twist lace, and other ornamental fabrics, looped or woven*, May 7.—Claim first.—The mode of constructing and applying pattern surfaces and wheels as herein described.

This part of the invention relates to a mode of giving the requisite shogging motions to the warp threads of bobbin-net or twist-lace machinery, by bringing a succession of pattern surfaces to act on the guide bars, and consists of a wheel with suitable notches around its circumference, for receiving filling or pattern pieces which produce the varying pattern surface.

The filling pieces are short round metal bars, attached by strings to a continuous strap of leather or other suitable material, which strap simply acts as a carrier, in order to bring up the filling or pattern pieces successively to the wheel, and thus operate successively upon the guide bars.

Claim second.—The mode of constructing spring-stemmed interceptors.

This part relates to the employment of a peculiar construction of independent instruments to act as interceptors of warp threads in bobbin-net lace machinery, and consists in forming the stems of such interceptors of springs, whereby the use of separate springs is rendered unnecessary.

Claim third.—The mode of applying jacquard or perforated surfaces to the guide bars of bobbin-net lace machinery.

This part relates to a mode of using perforated surfaces to work the guide bars. The perforated surfaces are plates of metal, connected together in a continuous chain, and which, by the revolution of the jacquard cylinder over which they travel, are brought in succession under a series of cranked levers that actuate the guide bars, the ends of these levers being so formed as to enter the perforations as they pass under them.

Claim fourth.—The mode of applying an extra point bar to the warp threads, in order to their being held for the carriages to pass through, and thus allow of the warp threads being racked, when such application is made to bobbin-net lace machinery wherein the warp threads are worked by independent instruments.

The fourth part of this invention consists in a mode of employing an extra point bar, to hold the warp threads open during the swing of the carriages through them, and in such a manner that the warp threads below the point bar may be racked and selected during the movement of the carriages, the extra points holding the warp threads from changing above them, notwithstanding there are changes taking place below them.

Claim fifth.—The mode of making lace and other fabrics in bobbin-net or twist-lace machinery, by causing each bobbin thread to interloop or weave with three warp threads in making the pillars of the meshes.

The last part of this invention consists in making each of the pillars of the lace of three warp threads interlaced by a bobbin thread.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page* 277.)

GEORGE DELIANSON CLARK, of No. 198, Strand, Middlesex, gentleman, for *an improved method of preparing tallow, fats, and oils, for various uses, by purifying them, and depriving them of offensive smell, and by solidifying such as are fluid, and giving additional hardness and solidity to such as are solid, and also by a new process of separating stearine or stearic acid, from the elaine, in such substances*, May 5.—The patentee does not claim as his invention the use of sulphuric and nitric acid, in small quantities for the purification of oils, as the same have been used before for that purpose; but what he claims is, firstly,—the employment of a larger quantity of sulphuric acid than has been heretofore used, by means of which a chemical change is produced in the oily or fatty substances, and by such chemical change soft fatty substances are rendered more hard and solid, and fluid oils are converted into hard fatty matters, of the consistence of tallow, and all of them are deprived of offensive smell.

Secondly.—The employment of the chlorides of soda, or potass, or chlorides of other bases, in conjunction with the above, as another method, or as another part of the process, for disinfecting the most tainted fish oils, and fats of every denomination, and for converting them into hard substances.

Thirdly.—The employment of a higher degree of heat than boiling water, for ensuring the most perfect separation of the portion of sulphuric acid.

And lastly.—The mode of separating the stearine from the elaine of oils and fatty matters.

Previous to operating upon the fatty substances, they must, if in the state of soft solids, such as grease, &c., be made fluid by the application of heat, and kept at such a temperature as to maintain them in a fluid state; but if already fluid, as oils usually are, the heating is unnecessary.

From 20 to 25 per cent., by weight, of concentrated sulphuric acid, is now mixed with the oily or fatty matter, by rapid agitation in a vessel of lead or wood, which is to be kept covered the whole of the time, and after the fatty matter has been well incorporated with the sulphuric acid, as much nitric acid, of specific gravity ·445, as is equal to from 1-50th to 1-20th of the sulphuric acid employed, is to be added, and the agitation continued, until the whole is completely mixed, after which the mixture is allowed to remain for 24 hours. If the fatty or oily matters are free from impurities, the addition of the nitric acid is unnecessary.

A quantity of water, equal to about half the bulk of the mixture, is now added, and the agitation renewed till it is perfectly incorporated with the mixture; after remaining a sufficient time, the acid water is drawn off through an aperture at the bottom of the vessel, and this operation of adding water and drawing it off at the bottom is repeated until the water drawn off loses its acid taste.

The first portions of acid water that are drawn off contain a large quantity of sulphuric acid, which may be made use of in subsequent parts of the process, or concentrated to its original strength for future operations.

All traces of acid being removed, a large quantity of water is stirred in, until the mixture, which will have acquired a consistence like thick paste, will imbibe no more. The mixture is then put into a suitable air-tight apparatus, and steam, at a temperature of about 277 deg. Fahr., introduced, which temperature is to be maintained for at least half an hour. The mixture is then left to separate, and as much of the water as possible is drawn off by a cock at the bottom of the vessel, the fatty matter which remains in a fluid state being drawn off separately.

The fatty matter is now put into a tub or vessel, covered over to retain the heat, and left to rest, that the last portion of water and other impurities may separate from it, and when it has become clear, it is drawn off by stop-cocks' in the side of the tub, into another vessel, where it is agitated with a portion of magnesia, lime, a weak ley of soda, or any other suitable alkaline substance, together with chloride of soda or potass, or the chloride of any other base, until they are intimately blended. When the fatty matter has 'been divested of its noisome smell (if it possessed any), steam is again introduced into the tub, and the agitation renewed, while a quantity of the weak acid obtained in the earlier part of the process is added, for the purpose of removing the alkaline matters, and displacing the chlorine from

the chloride of potass or other base; after which a considerable quantity of water is added, and the temperature raised to the boiling point, by applying steam internally, or heat externally, to the vessel, and when the fatty matter has again become clear, it is drawn off as before into a suitable vessel, and a quantity of oil-cake in fine powder mixed with it, and also some finely-powdered animal charcoal; it is then suffered to settle, in order to get rid of the oil cake and animal charcoal, and filtered, if necessary; after which it is run into moulds, and will become solid in cooling, whether the operation has been performed on oil, grease, or soft fat.

The process for effecting the separation of the stearine from the elaine, in oils generally, is as follows:—The oil is mixed rapidly with about one-eighth of its bulk of strong sulphuric acid, and the agitation continued for at least half an hour. The mixture is then left at rest for four or five hours, after which it is put into four or five times its bulk of water, and well agitated. It then curdles, and separates into curd, and dilute acid, when about double the quantity of water originally used is added, and then left for twelve hours, when the stearine will be found to have separated from the elaine.

Tallow, or other fatty substances, undergoing this process, are treated exactly the same as the oil, being first brought to a fluid state by the application of heat.

ALEXANDER HORATIO SIMPSON, of New Palace-yard, Westminster, Middlesex, gent., for *a machine or apparatus to be used as a moveable observatory or telegraph, and as a moveable platform in erecting, repairing, painting, or cleaning the interior or exterior of buildings, and also a fire-escape,* May 5.—Claim first.—The use of a shaft or spar as herein described, with a gallery or platform suspended or attached so as to be capable of being raised or lowered on the shaft by a power, either manual or otherwise, exerted within the platform.

This machine consists of a shaft or spar, mounted in a step, in which it is capable of turning (the step being fixed to a foot or pediment), and supported laterally by stays, jointed at their upper ends to a collar, which slides on the shaft, but is retained in any required position by a pin. The lower ends of the stays fit into holes in the foot or pediment, so as to admit of the stays altering their position or angle, in relation to the shaft, and thereby supporting it in different positions. The shaft is constructed of wrought iron plates, rivetted together, and one side of it is formed by a rack sunk flush with the surface of the shaft, which rack may be of cast-iron; but one of the lantern form is preferable, the teeth of which is formed by long bolts or rivets, running across in the same position as the teeth of the cast-iron rack. On the shaft is a sliding frame, to which is attached a gallery for the reception of workmen, tools, &c., and this sliding frame is fitted with a pinion, which working in the rack of the shaft raises or lowers the gallery or platform, according to the direction in which it is turned.

This machine may be used as a telegraph, by having the usual apparatus attached to the top of the shaft, or it may be used as a moveable observatory.

Claim second.—The use of a horizontal suspension rail, supported by shafts or spars, with a platform or gallery suspended therefrom, capable of receiving motion from within the gallery.

Claim third.—The giving motion to the gallery or platform, by the application of a power, either manual or otherwise, from a point not within the gallery or platform.

This part of the invention is an improved construction of scaffolding, and consists of two shafts, placed one on each side of the front of the building, similar to that before described, but without the rack and platform with its appendages. On the top of these shafts is fitted a cross rail, on which is mounted a carriage running on flanged wheels, and to these wheels are fixed two "gallows," suspending a light ladder by a pin or bolt. On the centre of this bolt is a roller or pulley, over which a rope passes, one end of it being fastened to a gallery similar to that before mentioned, and sliding on the ladder, and the other end to a counterpoise weight. On the foot of the ladder there is another roller, that runs on a cross bar, similar to the bar at the top, but which roller supports none of the weight of the ladder, as it rolls nearly horizontally and against the side of the bar, being provided for the purpose of permitting the ladder to travel easily to and fro.

In order to bring the gallery to bear on any portion of the surface of the building that the workman may require, four ropes are provided; two of these are fastened to the bottom of the shafts, and passing over two live pulleys at the foot of the ladder, proceed up to the gallery; the other two are fastened to the top of the shafts, and pass over two live pulleys, on the same axletrees as the wheels of the carriage before mentioned, into the gallery.

Now if the person in the gallery pulls the two top ropes, he raises the gallery, or if he pulls the two bottom ropes, he lowers it; if he pulls either of the two side ropes, namely, those attached to the same shaft, leaving the other two side ropes loose, the gallery and ladder will move horizontally in a lateral direction.

ANDREW KURTZ, of Liverpool, manufacturing chemist, for *a certain improvement or certain improvements in the construction of furnaces,* May 5.—The object of these improvements in furnaces is to consume the smoke, and thereby economise the fuel.

Claim.—The peculiar positions of the fire-bars, particularly their rising obliquely from the fire-door towards the bridge of the furnace, together with the hollow bearers underneath them, by which the heated air is distributed through the various air-passages in the furnace, and is caused to impinge upon the smoke over the fire-bed in an unlimited number of currents, passing through suitable apertures constructed in the furnace or fire-place in front of the bridge; and also the air-passage formed in the bridge behind the fire-bed, in furnaces constructed for marine purposes, or in such situations where a sufficient quantity of heated air cannot be introduced over the fire-bed.

The grate or fire-place of the furnace consists of three distinct sets of fire-bars, joined together so as to form the grate; the first set inclines obliquely downwards from the entrance or fire-door towards the bridge of the furnace, the second set is perfectly horizontal, and the third set inclines obliquely upwards from thence towards the bridge, thus forming a hollow fire-bed or grate, having a sufficient depth in the middle for the ordinary heating purposes of the furnace.

The fire-bars are supported by transverse hollow iron bearers, which have a slot in their undersides open to the ash-pit, and are connected at each end to air-passages in the walls of the furnace, that terminate in suitable apertures above the fire-bed in front of the bridge. The air from the ash-pit enters the hollow bearers through the slots, and, becoming heated, rushes through the air-passages and apertures before mentioned into the furnace, when it impinges upon the smoke and effects its combustion.

In those situations where a sufficient quantity of heated air cannot be introduced over the fire-bed, an air-passage is formed in the bridge, across its whole width, communicating with the hollow bearers, by which means an additional quantity of heated air is obtained to act upon the smoke.

GEORGE DACRES PATERSON, Esq., of Truro, Cornwall, for *improvements in curvilinear turning; that is to say, a rest adapted for cutting out wooden bowls, and a self-acting slide rest for other kinds of curvilinear turning,* May 5.—The first part of this invention consists of a rest or machine for cutting and forming wooden bowls, and other wooden vessels of a similar description.

The rest consists of a box or stand, which is made to slide on the bed of the lathe, and is worked to and from the mandril of the lathe by means of an endless screw; on the front of the box (which is made of iron) exactly opposite the mandril is fixed a piece of cast-iron, nearly simila in shape to half a cup, which the patentee term a semi-cup, its flat side being against the box In the semi-cup is screwed a centre, similar to the centre on the poppet of a common lathe, and in the centre of the semi-cup is fixed a strong iron bolt, that serves for the axis of a bent lever, to which the tools for cutting are attached. This lever is bent, or set off from its axis, sufficiently to allow it to describe rather more than a quarter of a circle without touching the edges of the semi-cup.

The tools are similar to the parting tools used by fancy turners for cutting soft woods, except that they are curved, so as to describe rather more than a quarter of a circle of a size proportionate to the size of the bowl or vessel required, and are also curved from the top to the bottom, in a sufficient degree for allowing the tool to work in the grooves of the block of wood it is cutting, without any other part except the point bearing on the wood. They are placed in grooves in the lever, adapted to the shape of the tools, and secured by screws. A smoothly planed iron plate is screwed over on the top of the tools, in order to keep them and the lever steady.

Claim first.—The rest or machine made in the manner herein described.

From the semi-cup to the front of the rest, on the side opposite the mandril, is fixed a plate of iron or brass, in which grooves are cut for the tools to work in, and at the back of the bent lever is fixed a quadrant, one end of which is attached to the outer extremity of the lever, and the other end is secured to an arm affixed to that part of the bent lever where it clears itself of the semi-cup. The quadrant is actuated by an endless screw, turned by hand or machinery, by which means the beut lever with the tools is set in motion.

The second part of this invention consists in a mode of making a slide-rest self-acting, to be used for turning balls and other sorts of curvilinear turning.

The rest is similar to a common slide-rest, except in the following particulars:—The tool is fixed above the rest on a small brass or iron block, to allow it to work as close as possible to each centre, and instead of the winch handle used in slide-rests to press the tool towards the work, there is a toothed wheel, which comes in contact (as it approacbes each centre) with an iron bar; this bar is so placed that the pressure of the wheel against it causes the wheel and screw attached to it to move a short way round, thus pressing the cutting tool towards the work.

The regulating screw is in this case pressed against a small cog-wheel, above which a small bar with a rack on it works freely; then as the rest approaches the centre on each side this bar touches a lever, which, when pressed, will force the band off the live drum on to the dead drum; but as the bar works freely in the manner described it is forced in, and the lever is not disturbed until the screw fixes the wheel, when the lever is forced back, and the lathe stops.

The socket on which the rest is fixed consists of a solid "spill" of iron, over which a hollow tube is fixed, the top of the tube being screwed to the bottom of the rest. The bottom of the tube has a square base, resting on an iron plate, which works on a brass dove-tailed shaped box, firmly fixed on a horizontal wheel, that forms part of the gearing for working the slide-rest. On the square base of the tube is fixed the cog-wheel and bar before mentioned which stop the lathe, the brass that carries the regulating screw being lengthened to bring the screw parallel to the wheel.

The slide-rest is put in motion by gearing from the mandril of the lathe.

Claim second.—The combined adaptation of the machinery herein described for making the slide-rest self-acting.

GRORGE EDMUND DONISTHORPE, of Leicester, machine maker, for *certain improvements in machinery, or apparatus for combing and preparing wool and other textile substances,* May 7.—The patentee claims

under the first and second parts of the present improvements, the improved arrangements and constructions of machinery for combing and preparing wool and other textile materials to which such machinery or apparatus may be applicable, and particularly the application and use of the cams and eccentrics and the mechanical agents for giving the required motions to the combs, and giving to the holding combs the required movements, in respect to the rotary motion of the other set of combs, so as to bring the wool or other material gradually under their operation. And, lastly, under the third part of the present improvements, the application and use of hot fluids, as the heating medium for heating the combs in wool-combing machines, or those used for other textile substances.

The first part of this invention is an improvement upon the machinery for which a patent was granted to the present patentee and another in 1835, and consists in a new mode of moving the combs; the holding combs being moved vertically up and down by means of a cam on the main axis, on which a roller, attached to the lower part of the rod that carries the holding combs, travels. The other sets of combs are moved horizontally, backwards and forwards, by means of two levers, to the upper ends of which they are attached, the lower ends of the same being attached to horizontal axes at the lower part of the machine; on the centre of each lever is a pin or stud, which works in the grooves of two grooved cams fastened on the main axis, which, revolving, communicates the required movements to the combs.

The second part of this invention consists in giving an up and down movement to the holding combs, by attaching a horizontal lever at one end to the framing of the machine, having a roller near its centre, which travels over the surface of a cam on the main axis; and on the outer end of this lever the roller of the shaft that carries the holding combs travels; thus by the rotation of the cam the shaft is caused to move up and down. The other sets of combs have in this instance a revolving motion communicated to them.

The third part of this invention consists in heating the combs, by dipping them in a vessel containing hot water, hot soap and water, or any other hot fluid, previous to placing them in the machine.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 17th of July.

John Swindells, of Manchester, manufacturing chemist, due July 6.

William Newton, of Chancery-lane, civil engineer, due July 6.

John Rock Dory, of Great Queen street, Lincoln's-Inn-fields, saddlers' ironmonger, due July 6.

Henry Gunter, of Cullum-street, Fenchurch-street, merchant, due July 6.

Henry Bessemer, of Perceval-street, Clerkenwell, due July 6.

William Thompson, of Upper North-place, Gray's-Inn-road, brush-maker, due July 8.

William Lacy, of Birmingham, agent, due July 11.

Matthew Uzielli, of King William-street, merchant, due July 11.

William Newton, of Chancery-lane, civil engineer, due July 11.

John Barwise, of St. Martin's-lane, chronometer-maker, and Alexander Bain of Wigmore-street, Cavendish-square, machinist, due July 11.

Thomas Harris, of Cheffnall, Salop, veterinary surgeon, due July 11.

REGISTRY OF DESIGNS.

The following is a List of the Designs Registered from the 25th of March to the 11th instant, under the Act of Parliament for granting Protection to Designs.

NO. OF DESIGN.	DATE OF DEPOSIT.	NAME OF PROPRIETOR.	SUBJECT OF DESIGN.	DURATION OF COPYRIGHT.
	1841			
646	25 March	John Smeeton	Spring for Waistcoats	1 year.
647	25	Charles Fox Smith	Lamp Chimneys	3 "
648	29	Thomas Hopkins	Carpet	1 "
649	30	Wm. Milligan	Weavers' Shuttle	3 "
650	30	Wm. Hancock	File	3 "
651	30	Richard Goolad and Co.	Stained Paper	1 "
652	1 April	Henry Jones	Oven	3 "
653	2	John Walker	Flooring Cramp	3 "
654	2	David Morison	Design for Book-backs	1 "
655	5	Cross and Blackwell	Lamp Glass	1 "
656	5	Wm. Joseph Curtis	Railway Crossing	3 "
657	6	Wright and Crump	Carpets	1 "
658	6	Smith, Taylor, and Co.	Stove	3 "
659	6	Welch and Margetson	Garter and Fastener	3 "
660	6	Wm. Stidolph	Hand-guide for Blind Writers	3 "
661	7	Pendrill and Nicholls	Pencil-case	3 "
662	7	Ditto	Penholder	3 "
663	7	Ditto	Ditto	1 "
664	7	Davis Brothers	Tenometer	3 "
665	12	Johnson, Cammell, and Co.	File	3 "
666	12	Wm. Aston	Button	3 "
667	14	John Atkins	Metal Reed	3 "
668	15	Joseph Smith	Illuminating Glass Lenses	1 "
669	16	Joan F. Isodore Caplin	Dress Model	1 "
670	19	Holston, Sheppard, and Walham	A Measure	1 "
671	19	Welch and Margetson	Buckle	3 "
672	20	James Yates	Fender	3 "
673	20	The Cannon Company	Ditto	3 "
674	20	Simon King	Chimney Pot	3 "
675	21	John Gough and Sons	Carpet	1 "
676	21	Charles Houghton	Mallet	3 "
677	23	Thomas Hopkins	Carpet	1 "
678	26	John and Frederick Harwood	Inkstand	3 "
679	27	J. J. Hollingshed	Pen	3 "
680	27	Davey and Hawksford	Screw	3 "
681	27	H., J. and J. Dixon	Carpet	1 "
682	28	John Hynam	Label	1 "
683	29	Summers and Smith	Embossed Paper	1 "
684	30	Ibotson and John Walker	Cantoon	1 "
685	30	David Morison	Press	3 "
686	30	William Cribb	Label	1 "
687	4 May	Frederick Ogden	Instep Stretcher	3 "
688	4	Ibotson and John Walker	Cantoon	1 "
689	4	Ditto	Ditto	1 "
690	6	The Cannon Company	Stove	3 "
691	6	William Simpson	Mat	1 "
692	10	John Ridgway and Co.	Plate	1 "
693	10	Wright and Crump	Carpet	1 "
694	10	S. A. Carpenter	Chains and Links for Braces	3 "
695	11	Lea and Co.	Carpet	1 "

FOREIGN INTELLIGENCE.

FRANCE.

In a discussion on the navy estimates in the Chamber of Deputies on Friday, the inferiority of the French steam-boats in the Mediterranean to those of England was remarked on, and the necessity enforced of increasing their speed. It was stated that the French packets to the Levant scarcely averaged more than six or seven knots an hour, whilst the English boats went at the rate of eight. The jealousy of the superiority of England in the manufacture of marine steam-engines was again manifested during the debate, and the Ministers were once more urged to encourage the French engineers by ordering all the engines for the navy from native manufacturers. During the discussions on the building of ships, the discoveries of Dr. Boucberie for the preservation of timber were alluded to. The Minister of the Marine stated that the experiments were still in progress. M. Arago took that occasion to pass the highest encomiums on Dr. Boucherie's process, which he described as one of the finest discoveries of modern times.

An enormous organ is now being erected in the Abbey St. Denis. It contains about 6,000 pipes, amongst which are some measuring 52 feet, and weighing 12,000 lbs. This magnificent instrument is nearly completed.

SUBTERRANEAN CURIOSITY IN PARIS.

The well of Grenelle is not the only new subterranean curiosity in Paris: there exists another, which, although it has not the immense merit of Mulot's work, is nevertheless very remarkable. There is near the Marché aux Chevaux a brewery, the owner of which, M. Chapuis, suspecting that his house, court, and garden were placed above the catacombs of Paris, bored and ascertained that it was as be thought. Sure of success, he immediately set to work and built a stone staircase of 87 steps, through the spiral of which the liquids necessary for daily use might be brought up with the help of a windlass. But the staircase was the least part of the work; for at the depth of about 55 feet an empty space was found, not the quarry, but a void made by the accidental falling of the earth. M. Chapuis got this cleared with a great deal of trouble and expense, and then great columns were placed in order to keep up the bank of rock, upon which the faubourg St. Victor and St. Marceau

stand; and when you descend 87 steps, you enter into a large cavern, whose vast and long galleries offer an unlimited perspective. M. Chapuis has certainly the largest cellar in the world, in the catacombs of ancient Paris.

DISCOVERY OF ROMAN REMAINS.

There have been recently turned up from a field near Ancenis, in the Loire Inferieure, some fragments of Roman baths, a great number of human skeletons, many coins bearing the profiles of the Emperors Antoninus and Gallienus, a javelin, and several other iron weapons. It is concluded that this was the site of a Roman station, which had been taken by surprise, and the soldiers massacred, particularly as the iron javelin or spear was still fast in a leg-bone.—*Galignani's Messenger.*

BELGIUM.

Owing to the active measures adopted for the cure of ophthalmia in the Belgian army, the disease has been gradually diminishing, and there is not now a single case of the kind in the military hospitals.

The bronze statue of Rubens is at length completed, and has been sent from Liége to Antwerp, the place of its destination.

The cannon foundry at Liége has contracted with a house at Antwerp to supply forty-four mortars, each weighing four thousand kilogrammes, which is equal to about four tons.

The approaching exhibition of the works of national industry at Brussels is expected to be very imposing. The *Fanal* says, that the manufacturers at Charleroy are hard at work at some beautiful specimens of machinery which are intended for exhibition. The manufacturers of Ghent and Liége are also represented to be busily preparing different articles to be exhibited as specimens of their style of workmanship. It is expected that there will be an unusual number of large machines sent to the exhibition, and among others the machinery for spinning linen thread, which the Brussels paper we have just quoted asserts is much better made by the *Phœnix* establishment at Ghent than any English machinists; even which is said to be admitted by those spinners who have used both.

A Brussels paper announces the arrival in that city of Dr. Beck, the inventor of the plan for navigating the most rapid rivers against the stream by means of a motive power that is represented to be without limits in its operation, and in which he uses neither steam nor wind power, nor hauling from the banks. It is stated that M. Wagner, of Franckfort, the inventor of the application of electro-magnetic power to navigate boats, &c., Dr. Bœttger, president of the Physical Society of Franckfort, M. Pauli, the first royal engineer of Bavaria, and many other distinguished scientific men, have proved by experiment the great advantages of this important invention.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

Opening of Railways.—The last day of this month will be a marked one in the annals of railway travelling in the West of England. It is positively announced that the Cheltenham and Great Western Union is to be opened as far as Cirencester; the Great Western to be further opened as far as Chippenham, leaving only twelve miles of this magnificent undertaking to complete; and the Bristol and Exeter, as far as Bridgewater, all on Whit Monday.

Glasgow and Edinburgh Railway.—The contractors on the above line of railway are getting forward with their respective portions in a manner highly satisfactory. It is expected the railway will be opened from end to end in the month of August next, and should favorable weather continue, we have no doubt but such will be the case.—*Glasgow Chronicle.*

The Blackwall Railway Extension.—The works of the Blackwall Extension line, from the Minories to Fenchurch-street, are now in such a state of forwardness that it is expected to be opened in the course of next July, when we may hope to see the commencement of a complete development of the immense traffic resources of this railway.

Railway Conveyance to Edinburgh.—The North Midland and other connected railways are making arrangements, by which they will be able to convey passengers from London to Edinburgh in about two hours less time than they can go by the western routes. They will also be able, by the starting of a coach from Newcastle at half-past five in the morning, to take passengers from that town to London in a single day. The mails will shortly be still further accelerated on this line.—*Tyne Mercury.*

Railway Travelling.—In former times, a trip from Glasgow to Greenock was looked upon as a whole day's work, and one, too, about which considerable fuss should be made. But now the Glasgow merchant steps quietly along the excellent granite bridge, built by our townsman, Mr. Gibb, over the Clyde, takes his place in a comfortable first-class carriage, and reaches, without toil or trouble, his sugar-house, twenty miles distant, in less than an hour from the time he left the Trongate. What a business it used to be to go to Saltcoats or Ardrossan, to the sea-bathing! Coaches there were none, or only one, and that one too dear to be used, for family purposes, by the plain-living people of Paisley. Accordingly, a good close cart was procured, clean potatoe bags were filled with straw, the trunks were used as seats, and the mother, the servant, and the bairns, were entrusted to the driving of Jock Notman or Will Findlay, with his best coat on, who, starting at three or four on a summer morning, succeeded, in spite of sundry stops by the road for drinks of whey to the children, and a long one at Beith, for a feed of corn to the horse, in delivering them at their destination, by one o'clock in the day, in time to get the beds made up and the napery put right before the fall of night. Alas! how is all this changed. The husband puts his wife and children into a train, and goes with them, from Paisley to Ardrossan, in little more than an hour, returning to his forenoon business as cool and collected as if he had only taken his breakfast from the time he got out of bed.—*Aberdeen Herald.*

Railway Taxation.—The public will be glad to learn that information has been received at the different railway offices in Newcastle and neighbourhood from Matt. Bell, Esq., M.P., that the result of his interview with the Chancellor of the Exchequer on Saturday last was a declaration on the part of the right hon. gentleman that he intended to give up the present passenger tax on railroads, and to substitute a tax on the gross annual receipts on passengers at the rate of five per cent. Although it is not yet finally determined on, yet we have reason to believe that it is not the intention of the Railroad Regulation committee, now sitting, to recommend that the management of these works should to a certain extent be taken out of the hands of the directors, and entrusted to the Board of Trade, or commissioners appointed by them, and which would have been the effect of the bill originally brought in, had it passed into a law, and not been referred back to a committee. If our information be correct it will preclude the necessity of Mr. Bell proceeding with the amendment, of which he had given notice, to retain the management of railroads in the hands of directors, as at present, rather than give the control of them altogether into the hands of the Board of Trade.—*Newcastle Journal.*

Obstruction of a Railway.—A wagoner was on Saturday charged at the Sheriff's Court, Ayr, with driving a horse and "trip" of coal wagons across the Ardrossan Railway when a train was approaching. He was cautioned by the policeman, but he persisted in driving on, and the engineer of the locomotive had only time just to stop the train. Owing to the violent conduct of the prisoner, the coal wagons were upset in the middle of the railway. The punishment for such an offence may be two years' imprisonment, but in consideration of the subsequent contrition of the prisoner, and at the request of the railway company, the Sheriff sentenced him to eight days' imprisonment only.

Carriers and Railway Companies.—The question in dispute between Messrs. Pickford and the Grand Junction Railway Company, was brought before the Court of Exchequer again on Thursday. The point to be decided was, whether there had been a legal tender to pay for the carriage of goods the same price as is charged by the company to the carriers they favor. The Court decided that the declaration was deficient in that point, but leave was given to amend by pleading to the action, by which means the real point in dispute between the parties would be more substantially raised for the opinion of the Court.

MEETING OF ENGINEERS AND MACHINISTS.

On Wednesday evening a public meeting of engineers and machinists took place at the Mechanics' Institution, Great Smith-street, Westminster, for the purpose of taking into consideration the most efficient measures to be adopted for the raising of a fund for the erection of an asylum for aged and decayed operatives, and also for affording relief in cases of accidents. The meeting was held in the theatre of the institution, which was crowded.

Mr. Sylvester, the secretary, read the report of the provisional committee, which stated that it had been a subject of regret that, of the numerous philanthropic institutions which adorned the metropolis, not one had hitherto been raised for the reception or relief of aged and infirm engineers and machinists, who were so peculiarly exposed to numerous and fatal accidents. The objects contemplated by the proposed plan were, the raising of a fund for the erection of an asylum, and the granting of pensions to those members who could not be accommodated in the institution, and to provide temporary relief in cases of accidents, out of a separate fund to be raised by voluntary subscriptions. It was also intended that the widows of deceased members who had attained the age of 50 years should be eligible to the benefits of the institution during their widowhood.

Mr. Barringer moved the adoption of the report, and that the institution be designated the Engineers and Machinists' Asylum Society. Mr. Meacham seconded the resolution, and it was carried *nem. con.* The secretary then read a series of rules and regulations for the government of the institution, on which a long discussion ensued. On the motion of Mr. Ridley, seconded by Mr. Welsh, the rules were carried.

The Right Hon. the Earl of Clarendon was appointed President; and the Hon. C. P. Villiers, B. Wood, Esq., M.P., T. Maudslay, Esq., J. Maudslay, Esq., Joseph Maudslay, Esq., J. Field, Esq., and — Napier, Esq., Vice-Presidents.

The appointment of a committee, treasurer, and other officers followed.

After a vote of thanks had been passed to the provisional committee for their indefatigable exertions in promoting the objects of the meeting, the customary compliment was paid to the Chairman.

Sugar—From a return moved for last week by the Chancellor of the Exchequer, it appears, amongst other things, that the quantities of sugar imported into the United Kingdom in the year 1840 were as follow, viz.:—British plantation sugar, 2,202,833 cwts.; Mauritius, 545,000 cwts.; East India, 483,836 cwts.; Foreign, 805,167 cwts.; Total, 4,035,845 cwts.; and that the total quantity retained for actual consumption in the United Kingdom in 1840 was, 3,594,834 cwts. The net revenue arising from the duties on sugar in the same year amounted to £4,449'070.

TO CORRESPONDENTS.

The report of the Botanical Society, and other articles, are necessarily omitted this week from want of room. They shall appear in our next.

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 24 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes, containing the Nos. of every 6 months.

COPPER MINE IN JAMAICA.—The copper mine recently discovered in Jamaica is situated in Mount Vernon, a huge mountain six miles to the East of Kingston. The lodes run from east to west, with a dip to the north. The veins of ore are found in the neighbourhood of Lucky Valley estate in the parish of PortRoyal, and at the base of the mountain. The richest ore is a sulphuret, yielding 40 per cent. of metal. This ore is obtained in immense quantities from a shaft which opens on a small stream sufficient to carry away the debris. Several hundred weights have been sent to London and Swansea for smelting, great difficulty having been experienced in performing this operation perfectly in Jamaica, from the want of reverberatory furnaces. There is also a carbonate which yields 11 per cent. of metal by the humid process. This is a very beautiful ore, and occurs in what is called abon rock. The matrix consists principally of limestone, argillaceous sand-stone, slate, schist, and a fine black sand-stone. The black sulphuret, which is abundant, is obtained in masses resembling wet and rotten coals, soft when extracted from the mine, but hardens in the sun, and is full of pyrites. When dry it is perfectly friable. The situation of the mine is convenient, being only three miles and a half from the sea, and the road is a gradual descent to the harbor, Bull Bay, where there is good anchorage for vessels. It may be added that the mine is in full operation, a company having been formed, and all the shares bought up.

THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, MAY 15, 1841.

☞ We have this week occupied more space than we usually devote to law cases, with a report of the important trial relative to the alleged infringement of Mr. Neilson's patent, for the application of the hot-blast to furnaces, which has been the means of greatly improving the manufacture of iron. We are indebted for a great portion of the report to the *British Queen*, an ably-conducted journal which bestows much attention on matters connected with industry and science; whilst, from our own sources of information, we have been enabled to make additions and corrections, which will, we believe, render our report the most full and correct that has been published of this cause, in which patentees generally, and the iron masters particularly, are much interested. Though the trial lasted for three days, the main point on which the defence rested was the vagueness and incorrectness of the description of the invention in the specification. Other points had been mooted, and the witnesses for the plaintiffs were subjected to severe cross-examinations, with a view to obtain from them an admission that the application of a hot air blast was known previous to the date of Mr. Neilson's patent in 1828. All the efforts to invalidate the patentee's claim to the invention proved abortive, and the Attorney-General was obliged to rest the defence of the action solely on the defect of the specification.

It seems, indeed, that the patentee had not matured his invention at the time he was compelled to describe it; consequently there is a degree of vagueness, and in some respects an incorrectness, in the specification, which, if strictly interpreted against the inventor, might invalidate his patent. It is stated, for instance, that the form and size of the vessel in which the air is to be heated is immaterial; whereas, in fact, the useful application of the invention depends principally on the manner in which the air is heated in passing from the blowing apparatus to the furnace. In the first instance, the inventor employed vessels in which the heating surface bore a comparatively small proportion to the volume of air they contained, and for a long time the invention remained almost valueless, from the inadequacy of the means of imparting sufficient heat to the air. The improvements made in the plan of heating the air, partly by the original inventor, and partly by the defendants and others, has rendered the invention one of the greatest utility. The air is now forced through a convoluted series of hot tubes, by which means it is exposed to a large heating surface, and the requisite heat is imparted.

There is also another part of the invention extremely important in practice, not mentioned in the specification, which relates to the protection of the heating apparatus by placing it in contact with water. From these defects in the specification,—not arising from attempts at concealment, but from want of time to perfect so important an invention,—it was contended by the Attorney-General that the patent is invalid, because it is one of the conditions on which the exclusive privilege is granted, that such a description shall be given of the invention that any competent workman in the branch of business to which it pertains may be able to manufacture the article without further directions or experiments. On the other hand, it was maintained that the description given embodied the main feature on which the invention depended, viz. the heating of air on its passage from the bellows to the furnace, and that the means by which the air can be best heated would readily suggest themselves to persons acquainted with the subject. It must, however, be admitted, that the unsatisfactory attempts of the inventor to produce this effect, even years after the patent had been granted, negatives this plea.

The subject at issue appears to us to rest on a broader basis than mere lawyers' disputes about the completeness of the specification. It involves the question how far an abstract principle can be monopolised independently of the peculiar mode of its application. It has been previously determined, in several cases, that an invention may have a character and value which render it the subject-matter of a patent, distinct from the means by which it is reduced into practice; but the extent to which this principle may be carried has always been disputed. It is admitted, in Mr. Neilson's case, that he originated the idea of applying a hot-blast to furnaces; but this announcement of the principle that hot air might be thus advantageously employed was unaccompanied by such a description of the mode of operation as to enable any one without experiments to carry it into useful operation. The great merit of the discovery, however, depended on the principle that hot air could be so applied; the mode of best applying it being a matter of arrangement which might suggest itself to many when the original idea was given.

It is, indeed, a grievous hardship to the discoverer of an important scientific principle, that he cannot, according to the strict interpretation of the patent laws, be benefited by his discovery, and that he can only claim exclusive privilege to the mode in which it is applied. His application of the principle he has discovered may be defective, and others more successful in mechanical adaptations may thus rob him of the whole fruits of the discovery. We are glad to find that the practice of the courts, however, now tends to favor the original discoverer, though the law if rigidly interpreted might deprive him of his rights. We hope to see this principle of equity more generally extended in the courts of law. The difficulties against which inventors have to contend before they can legalise their claims to their inventions by obtaining a patent, are of themselves sufficiently discouraging; but, those difficulties surmounted,

to find, after all the thought, time, and expense bestowed, that they are deprived of their expected reward by technicality of the law, adds tenfold enormity to the injustice they experience.

NEW INVENTIONS.

ELECTRICAL CLOCKS.

We last week noticed Mr. Bain's apparatus for regulating common clocks by electro-magnetism; we shall now describe his olectrical clocks, in which electro-magnetism is the moving as well as the regulating power. There are three modes in which tho inventor carries the principle into effect. In every instance, however, the movement is produced by allowing a current of electricity to pass at regular intervals through the wire coils of an electro magnet, which acts for an instant in drawing to it a piece of soft iron. The intervals of the currents are determined by the motion of a regulating clock, which forms and breaks the connection with the galvanic battery in the same manner as in the apparatus we described last week. In one mode of applying this power the electricity acts on the magnet of each clock once an hour. The effect is to attract a piece of soft iron, which is fixed to a spring, and when the magnetic power is taken off, the reaction of the spring serves as the moving power, until, at the end of another hour, the spring is again bent by the magnet's attraction. This clock is thus wound up every hour; and it is regulated at the same time. In a clock of this kind a pendulum and most of the wheels of a common clock are employed; the principal advantage gained being, that it will never require any attention, as the electrical battery and the regulating clock, which may be connected with a number of similar clocks in the same town, constantly keep it in motion and properly regulated. In this arrangement two wires alone would be necessary, and the power would act alternately from one clock to another of the series with which they are connected. In another dispositiou of the apparatus, which is adapted principally to the clocks in one large establishment, or where only a few clocks are in action, the electrical currents are transmitted every second. In the latter case, each actiou of the magnet draws the second-hand on the dial the sixtieth part of the circle; there are are only three wheels requisite to indicate the time, independently of the dial wheels, nor is any pendulum, spring, or weight required. The transmission of the electrical currents every second by the motion of the regulating clock, serves all the purpose of the ordinary clock-work. As these clocks, however, act simultaneously, the electrical power required to work several clocks at the same time, is much greater than when the current is transmitted alternately from one clock to the other; this arrangement is therefore only applicable to a few clocks in connection with one battery. There is another form of the apparatus, also adapted for a more limited range than the first, in which two separate wires are connected with each clock, and the currents are transmitted alternately every minute, so that if sixty clocks were arranged to be worked by the same battery, the minute hand of each clock would be advanced one minute every time that the wheel of the regulating clock had completed one revolution. An improvement has been made by Mr. Bain in the galvanic battery adapted to work his clocks, by which means one battery will keep in full action for three weeks without being renewed, and at an expense not exceeding three-pence a week. A single battery is sufficient to work 3,000 clocks of the first construction, and 120 of the kind of clocks last mentioned.

MR. GRANT'S FUEL FOR STEAM-BOATS.

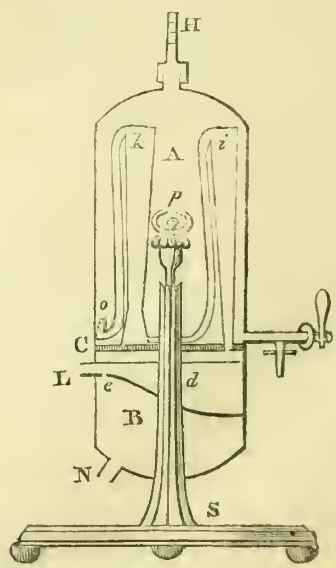
We take the following notice of Mr. Grant's newly invented fuel, which is especially applicable to steam-boats, from the *Hampshire Telegraph*, published at Portsmouth.

"We learn with great satisfaction, that this important invention of our ingenious townsman is at last to be brought into general use. The Admiralty, after a long series of experiments made under their directions by Mr. Grant, and followed up by frequent trials of his fuel in Her Majesty's steam vessels, instructed him some time ago to take out a patent, chiefly, we suppose, to secure themselves and the public against the interference of any pretenders to the invention. This point being settled, it became the wish, as it was the obvious duty, of Government to extend the benefits of Mr. Grant's labours to the country at large. Numerous applications having been made to Mr. Grant, by the various steam vessel companies, for permission to make use of his patent, the Admiralty, in a spirit of enlarged policy, have, as we understand, directed that gentleman to refer all persons to them who desire licences to manufacture his fuel. It is not our purpose, nor would it be proper, to describe minutely Mr. Grant's process; it will be enough to say that his fuel is made of coal-dust and other ingredients, mixed together in certain definite proportions, and then fashioned, by a peculiar process, into the shape and size of common bricks. The advantages of Mr. Grant's patent fuel over even the best coal may be stated to consist—first, in its superior efficacy in generating steam, which may be stated in this way —200 tons of this fuel will perform the same work as 300 tons of coal, such as is generally used; secondly, it occupies less space, that is to say, 500 tons of it may be stowed in an area which will contain only 400 tons of coal; thirdly, it is used with much greater ease by the stokers or firemen than coal is, and it creates little or no dirt, and no dust—considerations of some importance when the delicate machinery of a steam-engine is considered; fourthly, it produces a very small proportion of cliukers, and thus is far less liable to choke and destroy the furnace bars and boilers than coal is; fifthly, the ignition is so complete, that comparatively little smoke, and only a small quautity of ashes, are produced by it; sixthly, the cost of the quantity of Mr. Grant's fuel required to generate in a given time a given amount of steam, is so much less than that of the quantity of coal which would be consumed in effecting the same purpose, that, even if the advantages of stowage, cleanliness, and facility of handling, were not to be taken into the account, the patent fuel would still recommend itself to the attention of all steam-boat proprietors."

PORTABLE SODA-WATER APPARATUS.

The lecture delivered at the Royal Institution on Saturday, by Mr. Griffiths, on the manufacture of soda water, which is reported in another column, induces us to describe a portable soda-water apparatus invented by Mr. F. Bakewell, by which all the labor attending the ordinary means of manufacture is saved. The smaller form of the apparatus consists of an earthenware vessel about twenty inches long by seven diameter. This vessel is divided into two compartments; the upper one having twice the capacity of the lower. The lower division serves as the gas generator. There is an aperture at the bottom to admit the carbonate of soda, from which the carbonic acid gas is obtained, and there is a small cistern at the side for holding diluted sulphuric acid. Into the upper vessel the water, or other liquid to be aerated, is poured, leaving sufficient room for it to shake about. A communication is made between the upper and lower compartments by a tube, which rises to the top of the water and is then bent down. The earthenware vessel is cemented inside a strong wrought iron cylinder, and the cylinder is suspended by two props on an iron stand, so that it can freely vibrate backwards and forwards. When the apparatus is charged, and the apertures closed and screwed dowu tight, the machine is vibrated on its pivots, by pushing it on the top. The effect of this action is, to cause a small quantity of the sulphuric acid to overflow from the cistern and fall on the carbonate of soda. A quantity of pure carbonic acid gas is immediately generated, which having no escape but through the tubes leading into the upper vessel, it is forced through them and into the water by its elastic pressure. The agitation of the water, by the vibratiug action of the apparatus, facilitates the absorption of carbonic acid gas, and by continuing the vibration for about a quarter of an hour, the water becomes highly effervescent, and equal to the best soda water. Thus the various and laborious operations of generating the gas, of forcing it by a force pump into the water, and agitating the water by a paddle-wheel, are all effected by the mere vibration of this machine on its pivots. As the gas is made from the carbonate of soda, instead of from whiting, it is free from all impurities; and the water being contained in earthenware, is also another prevention from contaminatien by metallic impregnation. The soda water, when made, remaius in the vessel to be drawn off as wanted. An apparatus of the size we have described will make a gallon at a time, at a cost of threepence.

The annexed diagram will give a more clear idea of the internal arrangement of the apparatus:—



B is the lower vessel, or generator, N the aperture through which tho carbonate of soda is admitted, *d* the cistern for the sulphuric acid,

L the aperture through which the cistern is filled, and e is a small hole for the escape of a few drops of acid each time the machine is vibrated. A is the vessel for holding the water to be aerated; i is a conical tube, inserted into the division between the two vessels, and forms the only communication between them. The gas generated in B, is forced by its elastic pressure up i, through the other tube k, and is then forced through a number of small holes at a into the water. H is a pressure gauge, fixed at the top to indicate the amount of pressure; and p is one of the pivots on which the whole apparatus is suspended on the stand S.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING MAY 17, 1841.

Monday	Statistical Society	8	P.M.
	British Architects Society	8	P.M.
	United Service Institution	9	P.M.
Tuesday	Horticultural Society	3	P.M.
	Linnæan Society	8	P.M.
	Civil Engineers	8	P.M.
	Architectural Society	8	P.M.
	Chemical Society	8	P.M.
Wednesday	Society of Arts	7½	P.M.
	Geological Society	8½	P.M.
Thursday	Royal Society	8½	P.M.
	Antiquaries Society	8	P.M.
Friday	Royal Institution	8½	P.M.
	Botanical Society	8	P.M.
Saturday	Mathematical Society	8	P.M.

ROYAL INSTITUTION.

May 7. Friday Evening Meeting.

Mr. Griffiths delivered a lecture "On the Manufacture of Soda Water." The object he had in view was to give a popular account of this beneficial liquid, which involves a knowledge of both chemical and mechanical science. The materials requisite for its manufacture are pure water, carbonic acid gas, and carbonate of soda; these may be considered as the proximate elements of soda water. The ultimate constituents are hydrogen, oxygen, carbon, and sodium.

Water was first considered.—It is never absolutely pure when found in nature. It may however be obtained in its purest form by the chemist *synthetically*, viz., by mixing oxygen and hydrogen gases in the proper proportions, and passing an electrical spark through them in a Cavendish bottle, or other strong apparatus, as was first done by Sir H. Davy, in the laboratory of this institution. The process of distillation as invented by the alchemists is the mode employed to obtain water of sufficient purity for the purpose. The cheap manufacturers do not however use it in this state, but are contented with drawing it from deep wells.

Carbonic acid gas has attracted considerable attention since the time of Dr. Black. It is principally made by acting on carbonate of lime (marble, chalk, or whiting) with dilute sulphuric acid, when decomposition takes place; the sulphuric acid uniting with the lime, and the carbonic acid passing off in the shape of gas. Water exerts a solvent power over it, giving to it a slight acid taste, and having the property of reddening, although but faintly, vegetable blues. The gas is very soon dissipated from the fluid, even at the ordinary temperature of the atmosphere. This fugitive power of carbonic acid gas is further increased by heating.

Hales and Priestly discovered that by placing a vessel containing water into a jar containing carbonic acid that it imparted to the water a brisk and agreeable flavor; but it remained for Dr. Nooth to devise the means of obtaining it in a form suitable for a beverage. He constructed an apparatus composed of three vessels of glass, placed one above the other, and also in communication with each other, the upper two of which were filled with water, the gas as it is generated in the lower one, passes as fast as it is made through the water in the upper vessels, and is there partly absorbed. The superfluous gas is allowed to escape, and the water impregnated is drawn off as required. This apparatus was for some time to be seen on the side board of dining rooms, and is occasionally met with at the present day.

In 1798, Mr. Pepys assisted Mr. Desvines in his experiments on the properties of carbonic acid gas and water, a description of which was given in the Philosophical Transactions of that year by the latter philosopher. Suffice it here to say, that the process is a very slow one. In 1800 Mr. Pepys constructed an apparatus for condensing the gas in water, and in 1818 he obtained a strong aqueous infusion of carbonic acid by means of a machine, very similar to that now in use for the purpose. It consists of a vessel for generating the gas, this is connected by means of a tube to a condensing pump set in motion by a crank or fly-wheel, which pumps it into a glass vessel containing water through a silver tube passing nearly to the bottom of the water. This glass vessel is enclosed in a copper vessel in case of accident. It is then drawn off and bottled; the bottles now used are the invention of Mr. Hamilton. Further particulars may be obtained on referring to the 4th Vol. of the Quarterly Journal of Science and Art.

Soda Water of the best kind should contain a notable quantity of carbonate of soda; with the ordinary manufacturers this item is not attended to.

Mr. Griffith was indebted to Mr. Maugham for introducing him to Mr. Webb, of Islington, who has devoted nearly half of his life to the manufacture of soda water, and who kindly gave Mr. G. every information and access to his factory. There are, however, many hundreds of manufacturers, but Mr. Webb's is considered to be on as large a scale as any. The ordinary manufacturers are contented with obtaining the water from deep wells and pumping carbonic acid into it. Mr. Webb has a machine for aerating the distilled or condensed water, which he uses; this together with the other apparatus cost between £3,000 and £4,000, while the apparatus used by the ordinary makers may be obtained for £70 to £80. The water made use of by Mr. Webb, is condensed by a ten-horse engine, and is pumped into a tank holding 4,600 gallons, to which carbonate of soda is added. It remains there for a fortnight before it is cold enough to work, and is then a weak solution of the carbonate of soda. This is then passed into a copper vessel, the interior of which is plated with silver, and is now ready for the reception of the gas, which is compressed into it by means of force pumps, the pressure being exerted until the valve indicates 70 lbs. on the square inch; it is then in a fit state for bottling.

The ordinary manufacturers used formerly to employ vessels of lead for the purpose; they now use slate of two inches thick for all the articles used in the process; even the gasometer, after the gas has been previously washed as recommended by Mr. Pepys, is constructed of slate.

Cleanliness is a leading feature in this manufacture, and in order to prevent the oil used to lubricate the pistons of the force pumps giving a flavor to the water, they are washed in both the up and down stroke by a jet of water. In washing the bottles a revolving bottle brush is used with steam power; they are again washed and set to drain. The corks demand the greatest attention, inasmuch as they are found to contain many impurities which would materially tend to render the beverage unsaleable. They are thus cleansed,—about 150 gross of corks are placed in a wooden trough containing water (at the temperature of 80 degrees Fahr.) with fifteen pounds of carbonate of soda dissolved in it. They are pressed down by means of a board, and allowed to remain there for about twelve hours; this entirely removes the extractive dark brown matter from the corks, which is drawn off, and the corks are then dried by steam; were this operation not performed the soda water would abstract the extractive matter of the cork, rendering the beverage both colored and unpalatable.

The occupation of the bottler is one of considerable danger. The bottles are corked through a brick wall, and he is, in addition, furnished with a thick leather apron padded in front about the chest. The face is covered with a wire mask, and the hands are also covered. The bottle is placed on a little stand, which rising by means of a lever to the tube opens a valve. The cock is then turned, and the elasticity of the gas drives it into the bottle. He then has a cork handed to him by a boy, also similarly protected, which is put into the bottle and is beaten in by means of a wooden flogger: this is the most dangerous part of the process As soon as the cork is fairly in, the bottle is handed to a boy, who takes it in a piece of strong leather, and ties it down with string and wire. If the bottle be too thin to withstand the pressure it bursts, and severely wounds the workmen, provided they are unprotected. The average quantity that break in one day at Mr. Webb's factory when in full work is about twelve dozen. After it is corked there is a pressure of about three atmospheres in the bottle.

He then alluded to the properties of carbonic acid in detail as connected with the subject, and explained the process of fermentation, &c. Towards the close of the lecture *solid carbonic acid* was prepared, and mercury frozen by mixing ether with it.

CHEMICAL SOCIETY.

May 11.—Professor Graham, F.R.S., President in the Chair.

Messrs. Potter, Sylvester, De la Rue, and Hawkesley were proposed as members, and Messrs. T. P. Jones, Francis Watkins, &c., were elected. A paper was read from Dr. Gregory of Aberdeen, "On a simple and cheap Method of obtaining Hydrochloric Acid." The chief impurities met with in commercial acid were stated to be sulphurous acid and sulphate of soda, the existence of which rendered it unfit for many of the purposes of the chemist. The latter is carried over in a part of the process by spouting, while the former distils over. Dr. Gregory finds that by employing *two* equivalents of sulphuric acid instead of one, as mostly used, these impurities are prevented from passing over. The first two-thirds of the hydrochloric acid is produced without the slightest trace of water. He described a very simple and cheap apparatus for obtaining it, which allows of its being prepared in a sitting-room, and gave the details of his experiments, which were of a very interesting nature. He had produced some of the purest and strongest acid, the price of which was estimated to be from three-pence to four-pence per pound. He more particularly wished to recommend the process to manufacturers of re-agents.

Some remarks on the process were made by Dr. Leeson, and replied to by Dr. Clarke, who considered it a most trustworthy process. He alluded to the existence of the sulphurous acid to some considerable extent in the muriatic acid of commerce.

Mr. J. T. Cooper gave as his opinion that the compound of sulphur and oxygen generally considered to be sulphurous acid was really *Hyposulphurous acid*, and he has been led to this conclusion from the circumstance that in dissolving tin in hydrochloric acid a white precipitate is thrown down, an experiment he has never been able to succeed with, on impregnating absolutely pure hydrochloric acid with sulphurous acid.

Some remarks were then made by Dr. Clarke, "On a Process for detecting the comparative Hardness of Waters." The hardness of waters, as is well known, depends upon the quantity of carbonate of lime, &c., which is held in solution; but although soap has been for many years used as a test for detecting the hardness of water, no comparative experiments have as yet been given by means of which the practical chemist can ascertain statically the hardness of this very variable menstruum. The object Dr. Clarke had in view in the experiments he made before the society was to endeavor to show, that on agitating a solution of soap of a given strength in a definite quantity of water, that a point occurred on the addition of soap at which a froth or lather of greater or less degree of perma-

nency becomes evident. The solution of soap forming the test is dissolved in proof spirit of the sp. grav. 0·920, and the quantity of white curd soap, of Mr. Hawes' manufacture, to be added to one hundred and sixty grains of spirit, was only one grain. This formed the test. He enumerated the results of many sets of experiments, and gave other important details explanatory of his test, and its applicability to the purposes of the chemist. The ratio of hardness of the following waters was also stated as taken from the pipes supplying the towns:—

Aberdeen Water	required 2¼ oz.	to the	1,000 lb.
Edinburgh	 10	"	—	"
Glasgow	.... 10¼	"	—	"
New River Water	 26	"	—	"
Thames	 29	"	—	"

In order to show the correctness of the test, a single addition of one part was made in the experiments, which was immediately evident by rendering the latter much greater in quantity and more permanent in duration; but at the same time that he brought the results of these experiments before the society, he considered that much was yet to be done with the test.

Some remarks having been made on the subject by Mr. J. T. Cooper, Dr. Leeson, Mr. Hawkesley, and others, the meeting adjourued until the 18th inst.

METEOROLOGICAL SOCIETY.

May 11. *Lieut. Morrison, R.N., in the Chair.*

After the usual routine business had been transacted, the prospectus for the intended Quarterly Meteorological Journal was submitted by the publishing committee, to the council, for approval, and ordered to be forthwith printed. The following gentlemen were then balloted for, and elected members:—Col. Wylde, R.A.; W. M. Bilton, Esq., Portsmouth; F. E. Jones, Esq., Burton street; W. Stocker, Esq., Baldock, Herts; Mr. John Hague, of Philadelphia, as associate member. Mr. Roncetti was proposed as desirous of becoming a member. A long list of communications was then read, having been received since the last meeting.

PATENT LAW CASE.

ALLEGED INFRINGEMENT OF A PATENT.—NEILSON AND OTHERS *v.* HARFORD AND OTHERS.

This important case, of which we gave a brief notice in our last number, came on for trial on Tuesday morning, the 3rd inst., and did not terminate till the following Thursday evening.

The action was brought for an infringement of the plaintiffs' patent, which was dated the 11th September, 1828, for the improved application of air to produce heat in fires, forges, and furnaces, where bellows or other blowing apparatus are used. The plaintiffs reside in Glasgow, and the defendants (who were merely nomiual defendants, having been put forward by the iron masters generally for the purpose of trying the question) are the proprietors of extensive iron works in Wales. The trial created great interest among the iron masters, as it involves the question whether they are at liberty to apply the hot-blast for which Mr. Neilson's patent was takeu out. Sir William Follett and Mr. Fitzroy Kelly were retained for the paintiffs; and the Attorney General, Sir F. Pollock, and Mr. Richards, for the defendants. The first and second days were occupied entirely in hearing tho opening statement of counsel, and in examining witnesses, many of whom are distinguished for their scientific attainments. The defence consisted of a series of objections to the terms of the specification, that the invention was not new, and that, as described in the specification, it was not of public benefit.

Sir William Follett, in opening the plaintiffs' case, said he could not conceive what could be the line of defence the opposite party intended to take, as a more evident and barefaced invasion of a legal right could scarcely be conceived. This was no ordinary case, for Mr. Neilson's invention was, perhaps, the most valuable that ever was introduced: in fact, it was scarcely possible to exaggerate its usefulness, which he was prepared to prove by tho evidence of the most scientific men in the kingdom, and that of several iron masters counected with the manufacture of iron for many years. Mr. Neilson having obtained his patent as far back as 1828, was naturally desirous of maintainiug his right for the short space to run, knowing that to smelt iron beneficially, all persons embarked in the business should obtain licences from him; as, indeed, all others using his apparatus had done, with the exception of the defendants. The learned counsel then entered into a lengthened description of the hot-blast, as applied to smelting iron, and its beneficial results, which he clearly demonstrated. He also pointed out the close similarity of the defendauts' mode of applying the hot-blast to that of the plaintiffs'; and he contended, that such an application was a decided infringement of the patent.

The first witness called was Mr. Russell, a Fellow of the Royal Society of Edinburgh and Vice-President of the Society of Arts. He said he had been long acquainted with the process of smelting irou previous and subsequent to the introduction of the hot-blast, and he expressed a decided opinion of its beneficial effects, and his firm conviction that no such method had been in use previous to the invention claimed by the patentee. He had visited several iron-works where the principle of the hot-blast had been in use, although not in precisely the same method of heating the air, which, in his estimation, by no means disturbed the inventor's claim to originality. A lengthened examination took place respecting the several issues set forth in the plea, which went to prove that the objections to the specification were groundless, as in his opinion the invention was new and was of great general benefit, and that a mechanic of ordinary skill would be able to construct from it a machine or vessel for heating air to be conveyed into the furnace for smelting iron.

Mr. Penrice, a proprietor of Low Muir iron works, who has had forty years' practical experience in the smelting of iron, Mr. Farey, Professor Daniel, Mr. Kirkham, and Mr. J. T. Cooper, were subsequently examined and cross-examined at great length. The substance of their evidence confirmed that of the first witness, though they differed in opinion whether the description in the specificatiou was such as to enable an ordinary mechanic to construct an available apparatus for the application of the hot-blast.

On Thursday morning the Attorney General addressed the court aud the jury on behalf of the defendant. He said that the various scientific and practical men who had been examined on the trial were of different opinions as to the mode in which a man of ordinary skill and ability would attempt to carry the invention into operation, from reading the specification. In the case of the King *v.* Wheeler, for an infringement of a patent for a new mode of drying and making malt, a rule was laid dowu by Lord Tenterden, that a specification which cast on the public the expense and labor of experiments aud trials was undoubtedly bad. Now, in this case, one witness stated that he would begin with an air-vessel of a particular shape; another said he would try it in tho form of a retort; and a third stated that he would adopt the bottle form. In the specification there was no diagram, no plan, no lines or figures, in short, there was nothing of instruction whatever to guide the operative in the construction of the apparatus. There was also this additional objection, that it was impossible for any one who might read the specification to state for what the claim was made. Now, this was obviously a monopoly which excluded tho public from the use of an invention, of which no plan had been marked out to show whether the adoption of it would be an infringement or not. Mr. Neilson's title was "an improved application of air to produce heat in fires, forges, and furnaces," but he did not specify a means by which heat was to be produced between the blowing apparatus and the furnace. Instead of being a working plan, the whole specification was full of uucertainties and ambiguities, thus defying a mechanic to carry the invention into effect. Tho plaintiffs had called witnesses from Wales, from all parts of England, and from various iron works in Scotland; but these witnesses spoke merely as to speculative opinions, and not one word as to the mode in which the hot-blast was to be applied to the smelting of iron. The specification gave no information as to how the process was to be carried into operation; on the contrary, it misled the public as to the size of the vessel in which the air was to be heated in proportion to the furnace for which it was required; and it gave false information as to the materiality of the form of the vessel. Mr. Neilson could not tell them the difference in the application to a blast furnace and to the smelting of iron. He not only did not point out the tubular form employed and adopted by the defendants, and which he affected to consider an infringement of his pateut, but he actually excluded it altogether. The first clause of the specification stated that the discovery was to increase the heat by heating the air; but it was clearly shown that everything depended on the form of the vessel, for, if it was not tubular, it would be of no use. Not only was there no suggestion of a succession of horizontal and vertical tubes, but this plan was altogether excluded, and only one vessel was contemplated by the patent, this vessel to be increased in dimensions as required. The air was to be passed into a vessel made sufficiently strong to endure the blast, and from that vessel was to be forced, by means of a pipe, tube, or aperture, into the fire, forge, or furnace; from which it was evident that Mr. Neilson contemplated that the air was to go right through in a current. The tube could not be considered as a part of the heating vessel; the operation of heating the air was accomplished before the tube was brought into operation. The specification next stated that the air-vessel should be made of iron, but if this was not convenient, other materials might be used; and as to the size, it might be increased in proportion to the quantity of blast and heat to be produced. Now, in the invention produced by the defendants, the size had not been increased, for if these directions had been followed, it would have signally failed. He coutended that it was constructed on an entirely different principle, and that the specification of the plaintiff was an entire misdirection. In the case of a smith's forge, where there was only a cubic foot of air to be heated, it might do very well; but when they enlarged it, it would not heat the air at all. The whole secret of producing the required effect was by changing the form of the vessel, and, instead of having the retort, to introduce the tubular form; and yet they were told in the plaintiff's specification that the form of the vessel was altogether immaterial. The plaintiff admitted that he had tried the rectangular form, and found that it would not answer. It was now admitted ou all hands that as far as the productiou of heat was concerned, every thiug depended ou the form of the vessel, iustead of its being immaterial. An intense heat was produced when they employed a series of vessels in the tubular form; and how did the plaintiff attempt to get over this difficulty? Why, by endeavoriug by these proceedings to iutroduce into the enrolled specification something that would entirely contradict the whole tenor of it—for all the witnesses had told them they must atteud, in the first place, to the heating surface, and, in the second, to having a proper current of air between the apparatus and the blast furuace. The specification omitted that which it should have included, and included that which should have been omitted. Mr. Russell, a scientific gentleman, and a fellow of the Royal Society of the Northern Metropolis, as well as vice-president of some other institutions, had been examined. After a great deal of examination, all they had got this gentleman to say was that "the impression on his mind

was that a person thoroughly acquainted with the principles and practice of heating fluids, might, on reading the specification of the plaintiff, be able to construct an apparatus for heating air, and after a good deal of experience and consideration might be likely to adopt an apparatus like that invented by the plaintiff." Now, admitting this to be the fact for argument sake, it did come expressly within the rule laid down by Lord Tenterden that "any patent or specification which cost the public the labor and expense of trials and experiments was undoubtedly bad." It was clear, therefore, that Mr. Neilson, the patentee, was not competent to carry the invention into perfect operation, if it were true, as had been stated by Mr. Russell, that no man of experience would resort to anything but the tubular form. As to the cylinder, he would ask, did Mr. Neilson know when he made the specification, that partitions were necessary to be introduced into that part of the apparatus? If he did know, why did he not mention it; for he was bound to tell the world all the particulars. But the fact was, he did not know, and therefore the Crown was wrongfully induced to grant letters of patent. The specification should have been such as that a working mechanic, by merely looking at it, would know how to carry the design into effective operation. All the evidence, however, went to prove that one man might have made the air-vessel round, another, oblong, and a third might have resorted to the tubular form; thus bringing the matter clearly and indisputably within the rule laid down by Lord Tenterden. One of the witnesses, Mr. Farey, a civil engineer, cut rather an unphilosophical figure under cross-examination. The new classification laid down by this witness of the "inventive" the "less inventive," and the "administrative" would no doubt appear in the next edition of the Encyclopædia. He told the court that Boulton and Watt, looking at the specification, would make the apparatus exactly in the way adopted by the defendants. Now, with all respect to this very scientific gentle man, he saw no reason for associating the names of Boulton and Watt, on this occasion. He looked upon Mr. Watt as one of the greatest philosophers, and he (the Attorney-General) had no doubt whatever that had Mr. Watt been shown the specification, he would have been obliged to resort to his invention as to the manner of carrying it into effect. If this was the case with a man like Mr. Watt, how was a common mechanic to construct the apparatus —when even distinguished philosophers, like those produced in the witness-box, differed so essentially as to the best mode to be adopted? Professor Daniel told them expressly that he should feel it necessary to make various experiments; and Mr. Cooper, the last witness called, stated in precise terms that there was no specified method in the specification, so that this was a specification which specified nothing. He contended, therefore, that all the evidence adduced for the plaintiff confirmed the objections set up by the defendants, and which, in his opinion, were insuperable. His learned friend, Sir Wm. Follett, at the opening of the case, told them, that he would give them the whole history of the invention; but had he done so? Did he tell them what had taken place previous to the invention, and how it had been conducted since? He did not. He did not call before them any person from the Clyde iron-works, for he knew that such a course would only disclose a series of experiments. But he had produced a witness from Low Muir iron-works (Mr. Penrice), who was not the manager but the surveyor of the works, and he told them that, after six months' experiments, they had been obliged to give up the hot-blast altogether. The burden of proof lay with the plaintiff to show what was the expense of the hot-blast before the tubular form was introduced; whether or not it was profitably employed, and whether the profits overbalanced the expenditure. Mr. Penrice proved that it improved the quantity and quality of the iron, but it was indispensably necessary to give a balance sheet, in order to show the amount of expenses and increased profits. The whole tenor of Mr. Penrice's testimony went to prove that until the tubular form was introduced, the hot-blast could not be employed with advantage. The effect of Mr. Kirkham's evidence was to show the necessity of experiments, and that invention and expense were necessary, in order to carry the process into beneficial operation. They had been certainly told by one of the witnesses that, in whatever shape the invention might be employed, it must be of advantage, but there was no evidence before them to show to the satisfaction of any reasonable man that the process could be conducted with any benefit without applying the labor and expense of invention and experiments. The heat of the air was so great on being injected into the furnace, that unless they had some contrivance to cool the pipe, it must be an utter failure. Now, the patentee had omitted altogether from his specification the water tuyère which had been introduced to effect this desirable object; and the way in which his learned friends on the other side endeavored to get over this objection was very remarkable. They said the necessity of such a contrivance was so obvious, that Mr. Neilson thought it unnecessary to specify it. They had it in evidence that the dry tuyère gave way upon an average at least once a day, thus involving great trouble and expense; and it was allowed by all that the hot-blast could not be beneficially employed so long as it was kept in use. If Mr. Neilson knew of the necessity of the water tuyère, then he had fraudulently concealed it; and if he did not know it, why the specification must be bad. For these reasons he trusted it was abundantly evident that the patent could not be supported, and that Mr. Neilson could not have had the smelting of iron in contemplation when he took it out. If he had derived any profit from this source, he might well be contented with his good luck. It was quite clear that the plan adopted by the defendants was a totally different process, and if there was any validity in the specification there was no infringement of the patent. The witnesses for the plaintiff had entirely proved the defendants' case, and he would not therefore occupy [time by bringing evidence before the jury, but hoped he had sufficiently established the right of the public to enjoy the tubular form introduced, and which was not included in the specification without restriction. He could assure the jury, that if his clients had not been fully convinced that they were doing only that which the law permitted, and which they were perfectly entitled to do, they were the last men in the kingdom who would infringe upon the rights of others. He trusted that the verdict of the jury would have the effect of establishing the invalidity of the patent, and of throwing open this mode of smelting iron to the public at large.

Sir W. Follett submitted, that the Attorney-General was bound to give evidence of his objections, in compliance with the 50th section of the 5th and 6th William IV., otherwise the objections could not lie.

The Attorney-General said, having called no witness, Sir Wm. Follett had no right to be heard.

Baron Parke said this was one of the inconveniences arising from a departure from the rules of the common law courts; but the legislature never could have intended to give the patentee the right of reply, where no evidence was called by the other side. He did not see exactly how the objections could be made use of; but he thought it would be better to have them read. The learned counsel consented, and the objections were then read; after which

Baron Parke proceeded to sum up the evidence. He said the patent appeared to have been originally granted to Mr. Neilson alone, but had been subsequently assigned by him to two other gentlemen, who were now plaintiffs with him in this action. The declaration stated that there was a proviso in the patent that it should particularly describe the invention to be enrolled. As the law stood seven or eight years ago, it would be only necessary for the defendants to plead that they were not guilty of the infringement; but by the Act of Parliament to which reference had been just made by Sir William Follett, the defendants were called upon to specify their objections to the patent and specification, and the jury were bound to deal with these objections singly. He (the learned judge) would express his opinion on the law of the case, and it would be for the jury to deal with the matters of fact. The first objection was, that the defendants were not guilty of the infringement; secondly, that Mr. Neilson was not the original discoverer of this invention; thirdly, that it was not a new invention, and that the plaintiff was not entitled to the benefit of it because it was known before; fourthly, that the specification was in a certain form which did not truly and accurately describe the nature of the invention, so as to satisfy the proviso on which the letters patent were granted; and fifthly, that the invention so specified had not been of any public use or benefit whatever. There was no question in this case but that the invention of the hot-blast as now used was highly valuable to the arts, and that the plaintiff had either invented it or had led to its discovery. There was no doubt or difficulty whatever as to the mode in which these patent rights were to be disposed of. During the previous 20 or 30 years it had been very much the practice with judges and juries to destroy patent rights where technical objections were urged against the terms of the specification; but, within the last 10 years, the courts had not been so strict in entertaining objections on these grounds, but endeavored to hold a fair and equal hand between the patentee and the public. The best mode of disposing of this case would be to take the objections in the order in which they arose. In the first place, then, let them examine whether there had been any infringement of the patent, and he apprehended that there could be no doubt there had, if the specification was free from the objections taken to it. Unquestionably, what the defendants had done was a great improvement on the original invention, but that did not render it the less an infringement. The second objection was, that the patentee was not the true and first inventor of a mode of applying hot air. Now, it appeared upon the evidence, that none of the witnesses for the plaintiff were aware of any invention similar to this, although it appeared that Mr. Botfield had taken out a patent for a discovery in the manufacture of gas; but that was totally different, and did not apply in the present case. The next plea which they came to was the important one as regarded the specification, and it would be necessary for him to draw the attention of the jury to this part of the case particularly. It was contended by the Attorney-General, that the title of the patent rendered it void, because no one would know from it that it was applicable to the purposes to which the apparatus now complained of was applied. His (the Judge's) opinion at present was, that the title of the patent was not defective, and it did not appear to him that the generality of the title would make it bad, and there was no evidence in the case to show that it was not the patentee's own discovery. As regarded the specification, there could be no doubt that a person was bound to express in clear and distinct terms the nature and application of his invention and discovery, according to the proviso in his patent. His impression of the meaning of the part of the specification which related to this point was, that the patentee claimed the invention of heating air in any vessel of any size, providing it was a close vessel, and placed between the blowing apparatus and the fire, forge, or furnace. But when the patentee stated that the form or shape of the vessel was immaterial to the effect required to be produced, he (the Judge) considered that statement an incorrect and untrue one; and being untrue, it vitiated the specification, and consequently the patent could not be valid. Nevertheless, he would leave the question to the jury, but he feared that they could not allow competent and skilful persons to correct the mistakes in the specification. It

was true that some effect might be produced by a vessel of any size; but the amount of effect depended entirely on the size of the vessel; and this, in his opinion, was the great defect in the patent, and formed a fatal objection to the specification. It was also contended that the patent was void, because the mode of constructing the vessel was not clearly pointed out. The patentee, however, claimed the invention of the mode of heating the blast in a vessel exposed to heat, and the specification stated that a person of competent knowledge and ordinary skill would construct such a vessel as would be necessary for the forging of iron. At first sight it would appear the patentee had supposed that in order to answer in blast furnaces, it was only necessary to increase the size. Now, if the jury were of opinion a person of ordinary skill would adopt this mode by merely looking at the specification, then the specification, as regarded this question, was good, and the objection must fail. They had the evidence certainly before them of one person trying a square box, although they had the evidence of several eminent men to show that it would not answer. One of the gentlemen examined had told them that in order to adapt the hot blast to the furnace, it would be necessary to introduce a different kind of tuyère, as the tuyères formerly used were liable to be burnt. Now, the specification omitted to mention water tuyères or other protection, and if it was the opinion of the jury that these tuyères were necessary, then the specification was void, and the objection was a good one. The first witness was Mr. Russell, who was a scientific gentleman, and he said that a judicious person, such as he would select, would be able under the patent to make an efficacious apparatus; but the phrase "judicious" person such as he would select, implied that it required something more than mere ordinary skill. The last witness (Mr. Cooper) admitted the necessity of the water tuyère to bring the invention to the highest state of perfection, and he also stated that a man might be required to make many experiments before he could bring the apparatus to its present state of completeness. If the jury were of opinion that a man of ordinary skill would be enabled under the patent to construct a valuable apparatus, the specification would not be insufficient. Sir William Follett submitted that the point, as regarded the form and size of the vessel to be used, was not contained in the objections furnished to the plaintiffs by the defendants, and it could not therefore be entertained. He (Baron Parke) differed in opinion from Sir William Follett. He considered that the fourth objection, which set forth "that the specification was in a form which did not truly and accurately describe the nature of the nvention, so as to satisfy the proviso on which the etters patent weregranted," was conclusive on this point. The leaned judge then proceeded to read from his notes such parts of the evidence as bore most directly on the points at issue, and, at the conclusion of the summing-up, put the objections to the jury *seriatim*, and recorded their verdict on each. Baron Parke said that he would put the first question as a matter of form, as it involved a point of law which would remain to be argued and decided elsewhere. He would, therefore, ask the jury were they of opinion that the shape and form of the vessel were material?

After a short consultation, the foreman replied that the jury had no doubt about that.

Baron Parke said he thought they could not. The next question was, did they think that a man of common understanding and ordinary skill, and possessing a knowledge of the old blowing apparatus, would be able to construct an apparatus according to the specification that would be productive of such benefits as would make it worth while to incur the expense of adopting the principle?

The jury replied that they were of opinion that a person of ordinary ability, and acquainted with the ordinary blowing machinery, would be able to construct an efficacious apparatus under the specification.

His Lordship said, the next question was, whether they believed that a person of ordinary skill, and acquainted with the air-heating apparatus, would correct the error in the specification which stated that the form and shape of the air-vessel were not material to the effect required to be produced?

The jury answered, that such a person would in their opinion correct the error, and would not be misled by the inaccurate description of the specification.

Sir William Follett objected to the minute recorded by the learned judge. The word "inaccurate" was not applicable, as no inaccuracy had been proved.

Baron Parke said, nothing could be plainer than the inaccuracy of description. The specification stated that the form and size of the vessel were not material to the effect to be produced, and the jury returned a verdict that they considered both material. For his own part, he had no doubt that the inventor had no idea whatever when he filed his specification of the materiality of the form and extent of the vessel. He had stumbled on a thing which turned out to be extremely valuable.

The jury next found that Mr. Neilson was the first and true inventor. Thus finding for the plaintiffs on the four principal issues, which would have the effect of establishing his right to the patent, but finding for the defendant, by the direction of the learned judge, on the point regarding the variance in the specification, with leave to the plaintiffs' counsel to move the Court above to have a verdict entered for the plaintiff.

SCIENTIFIC MEMORANDA AND NOTES ON ART.

Anatomical Lecture.—The Society of Arts, at their meeting on Wednesday week, voted their gold Isis medal to Mr. Simpson, surgeon to the Westminster General Dispensary, for the application of papier mâché to the making of anatomical figures and models of morbid anatomy. Mr. Simpson some years since turned his attention to the constructing of anatomical models, in consequence of the difficulty and expense at that time attendant on procuring subjects for dissection. The materials in general use for anatomical models were wax or plaster, of which the former was found to be too expensive to come within the means of lecturers and students in general, and was too delicate to be handled in the lecture-room without incurring the chance of considerable damage. The plaster of Paris models were also objectionable, on account of their great weight and brittleness. The material which Mr. Simpson uses is paper, worked into moulds taken from dissections; this produces a model of extreme lightness, and is so hard that it may be freely handled without danger of damage. The external surface is painted in oil-color, representing the appearance of the dissection. The right side of the figure which Mr. Simpson exhibited to the society represents the superficial arteries, veins, nerves, and muscles; the left side shows the second and third layers of muscles, the deep-seated vessels, and more particularly those parts concerned in surgical operations. The internal parts are removable, so as to exhibit the natural arrangement of the thoracic and abdominal viscera; the brain, and its membranes; the spinal marrow, tongue, &c.

Rope Making.—Sir William Barnett recommends the disuse of tar for yarns, and produces strong evidence to show that white yarn prepared is thirty-seven and a half per cent. stronger than the like weight and gravity of hemp worked with tar in the usual way.

A Smoking Plant.—A German botanist, who some time ago accompanied the English colony to the Swan River discovered there a plant, the flower of which, warmed by the rays of the sun, gave out at intervals a smoke similar to that exhaled by persons who smoke tobacco. The learned traveller was at first very much alarmed when he saw the smoking flower, and thought he had fallen into an ambuscade of savages.

Electrical Clock at the Reform Club House.—We last week noticed Mr. Bain's invention for regulating clocks by electro-magnetism, and alluded to his further invention of clocks in which the moving power is produced by electro-magnetism. The latter invention is disputed by Professor Wheatstone, who claims the merit of first discoverer. Mr. Bain asserts that the professor took the idea from him. Without now giving an opinion on their respective claims, we take the following notice of the application of the principle by Professor Wheatstone, at the Reform Club House, from a contemporary journal. "A newly-invented clock is about to be tried at the new Reform Club-house, being an application of electricity to multiply clocks, or rather clock faces. To a perfectly correct chronometer is attached a wheel with alternate teeth of wood and steel, and connected with this wheel are the wires of an electrical battery. The other ends of these wires are attached to a soft steel, round which copper wire is coiled, and which is thus turned into a powerful magnet. Below this soft steel is a small piece of iron connected with a series of wheels behind the false clocks. Every time a steel tooth of the wheel connects the wires of the battery and the soft steel, the latter attracts the small piece of iron, but when a wooden tooth comes round and disconnects them, the steel, ceasing to be a magnet, drops the iron. These alternate droppings and liftings occur every second, and, of course, the second hand of the false clock being connected with the piece of iron, beats simultaneously with the second hand of the large and correct chronometer, which is connected with the wooden and steel wheel. The false clocks cost about £2, and ave various wheels, &c., by which the minutes and hours are shown."

VARIETIES.

Trial of Seaward's Paddle-Wheels.—A successful trial of Her Majesty's steam-ship Styx, which has been fitted with Messrs. Seaward and Capel's patent for disconnecting the paddle wheels from the engine-shaft, took place last week in the presence of Admiral Sir P. Durham, Lord Prudhoe, Sir W. Symon, the Russian Consul, and numerous other scientific and naval gentlemen. The Styx started at half-past 11 from her moorings opposite the yard of Messrs. Seaward and Capel, and proceeded to Gravesend, and during her voyage the paddle-wheel was disconnected from the engine in an incredibly short space of time, to the satisfaction of the scientific gentlemen on board, who expressed their satisfaction of the usefulness of the invention. The Styx is a second class frigate, and her reported armament is said to be two 68 pounders on swivels and four 48. She is about 1,100 tons burden, and is considered an extremely fine ship.

Newspapers in Spain.—The periodical journals published in the provinces amount to 32, and those at Madrid to 18.

The Mammoth Steam-ship.—The Great Western Steam Company determined some time ago to fit out the Mammoth, an iron ship, of 3,200 tons, and upwards of 1,000 horse power, with the screw propeller; being now plated up, and her engines in a forward state, the directors have chartered the *Archimedes*, to enable them to decide upon the most approved arrangements of machinery, &c. The *Mammoth*, we hear, is to be put into the trade between Bristol and New York, and the proprietors confidently expect that she will perform her voyages considerably under the average time required by steam-ships at present. The position of the propeller being considerably under the water line, and in the dead wood of the vessel, it will be thus much less exposed to injury from gun shot, floating timber, ice, and other casualties, than the paddle-wheels. But the great advantage which a sea-going steamer, fitted up on the propeller principle, will possess over those with paddle-wheels, will consist in her superior facility of steering, and safety in lying-to in heavy weather. Her Majesty's Government have given immediate instructions for building an iron steamer to be fitted with the propeller.—*Morning Herald.*

The Sulphur Duty.—A letter from Naples quoted by the *Gazette du Midi*, states that, in a council of Ministers held on the 27th ult., the King had reduced the export duty on sulphur from 20 tarins to 8 tarins (about 3f. 35c.); the new duty to come into force from the 1st January next.

The Committee on Banking.—The inquiry into banking affairs by the select committee of the House of Commons appears to have been brought to an abrupt termination. After examining one witness on behalf of the Bank of Ireland, and another from the Provincial Bank of Ireland, it is understood that they have now adjourned *sine die* for the chairman to prepare a report.—*Times.*

Literary Fund Society.—The anniversary dinner of this society took place on Wednesday evening at the Freemasons' Tavern in Great Queen-street. The chair was filled by the Earl of Ripon. The subscriptions amounted to £682.

The *Leipsic Gazette* announces the death of Galvini, the musical professor, at the age of 104. He was a son of the celebrated singer Galvini, who died at Rome in 1825, having reached the patriarchal age of 138 (!)

Bursting of a Steam Boiler.—On Monday morning, the steam-boiler of a ballast barge, which was used for cleansing the bed of the river, lying off the south west of Blackfriars-bridge, burst, hurling with it everything in its way with tremendous violence. Several boats instantly put off to the assistance of the poor fellows on board, and they were rescued from drowning, as the barge sank very quickly. One man, however, named Constable, asleep below at the time, was buried underneath the wreck. On the receding of the tide, about half past ten o'clock, the body was found lying upon its back in what is left of the hold of the vessel.

Death from Machinery.—A boy, fourteen years of age who was employed at Mr. Kennedy's mill at Manchester, was last week killed by being carried up by a strap fastened to a shaft turned by the steam engine, while it was making 128 revolutions in a minute. The strap wrapped round his leg, which was torn off, and his head was also pulled from, his body before the engine could be stopped.

A valuable quarry of calcareous stone, fit for all the purposes of lithography, and as good as that of Munich, has just been discovered in Sicily. It had been long worked for building stones, but its application to lithography had not been thought of until it was accidentally visited by a German naturalist.

Madame Tussaud's Exhibition.—The art of modelling the human countenance in wax has been carried to greater perfection by Madame Tussaud and her sons than by any other artist in the country; and the tasteful and gorgeous manner in which the figures are dressed and grouped, renders their exhibition the most splendid and astonishing thing of the kind that has been ever seen in England. The great room at the Baker-street Bazaar is fitted up in a style of magnificence equal to that of the state rooms of a palace, and a new feature has lately been added, which if not strictly within the scope of the objects of the exhibition, will we doubt not prove one of its great attractions. The real coronation robes of George IV. are displayed in a room fitted up for the purpose with oriental splendour. One of these robes, the cost of which was £3,000, is displayed on a figure of the monarch, excellently modelled from the portrait by Sir Thomas Lawrence. Among the most remarkable of the detached figures in the collection is an admirable represention of the late Mr. Cobbett, sitting down, and supposed to be looking at a groupe in which the heroes in the late wars are brought together. The head of this figure moves by internal mechanism, and the effect is at first startling from the exact resemblance. The breathing recumbent figure of one of the female victims of the French revolution, watched over by the representation of Madame Tussaud herself, is also another of those astonishing counterfeits of life, which it is difficult to believe is inanimate.

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THE

INVENTORS' ADVOCATE,

AND JOURNAL OF INDUSTRY;

A WEEKLY BRITISH AND FOREIGN MISCELLANY OF

SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

No. 95.] SATURDAY, MAY 22, 1841. [PRICE FIVEPENCE STAMPED. CIRCULATING FREE BY POST.

APPLICATION OF THE ELECTROTYPE TO MANUFACTURING PROCESSES.

As soon as the first successful experiments with the electrotype were made known, it was easy to perceive that the same process was capable of very extensive applications. It was natural, in the first instance, that attention should be directed to its application in different branches of the fine arts, as it was in the re-production of objects connected with that elegant department of industry that the process was made known. From the re-duplication of medals, the experimenters extended their trials to busts, to statues, to engraved plates, and to leaves and flowers. All objects, it was found, could be thus successfully coated with a film of copper, of greater or less thickness, evenly deposited upon their surfaces by the decomposing agency of the galvanic battery.

It might be easily foreseen, that the discovery would not long be exclusively confined to the productions of the fine arts. Several ingenious and useful applications of the electrotype have been already suggested and made, by which it has been extended into the domain of manufactures. We conceive that it is calculated to advance with rapid strides in that direction, and to occupy a most important place in our manufacturing processes. As one of the steps in this progress, we may call attention to the specification of a patent published in our present number, in which the patentee claims the exclusive privilege of manufacturing copper tubes and vessels by the decomposing action of the galvanic battery. Without now calling in question the validity of such a claim, where nothing new appears in the mode of applying a previously-discovered process, we avail ourselves of the fact, to show that this new branch of industry is already cultivated and to speculate on the probability of its general extension.

If the molecules of copper deposited by electro-chemical action on the pattern of any vessel, form a mass equally compact and durable as that of wrought copper, the business of the coppersmith will be almost annihilated. Vessels and apparatus that now require days and weeks of labor and skilful workmanship may be completed by the silent working of time—the most complicated as well as the most simple—and be finished in a manner superior to any that the hand of man can produce. The joints and solderings that now consume much labor, and are the cause of most imperfections, will be entirely superseded, and all the convolutions and intricacies of the most complex apparatus, or the most delicate patterns and chasings, will be produced with the same facility and in the same time as a plain surface of metal.

It may be readily conceived that when this plan of workmanship is generally carried into practice it will be the means of introducing a complete revolution in all those articles of manufacture in metals to which such process can be applied. Numerous articles that are now made of japanned tin, on account of its comparative cheapness, would then be made of deposited copper, as the saving of labor would more than compensate for the different value of the metals.

Increased elegance of design and beauty of workmanship would be another consequence of adopting the galvano-plastic art in our manufactures, because from one beautiful highly-finished model any number of fac-similes might be produced with the same trouble as from the commonest and most rude. In this respect the galvano-plastic process possesses great advantages over casting in metal, independently of its far superior effects, because elaborate castings require more time and trouble in proportion to the intricacy and forms of the patterns.

The instances in which this mode of manufacture might be adopted with advantage are almost innumerable. The coating of copper deposited may be of any thickness; consequently it may in many instances suit the purposes of the manufacturer to obtain a very thin model in copper, the interior of which might be filled with lead or other cheaper material.

It may be objected that these anticipations are founded altogether on the supposition that the deposited copper will be equally durable with the wrought metal, and that experience may prove this expectation to be groundless. The trials to which the electrotype engravings are subjected under the rollers of the copper-plate press afford however a good test of the firmness of texture of the deposited copper molecules; but even were the articles so manufactured to be less strong than the wrought material, means might be found, by annealing or otherwise, to give the metal its proper degree of hardness.

In the preceding consideration we have confined our views to the known effects of galvanic action in the deposition of copper alone; but the same process has been, and might be, still further successfully applied with other metals. In an early stage of the discovery it was applied to silvering and gilding with peculiar advantage. In the progress of the art we have no doubt that the deposition of other metals besides gold, silver, and copper, will be made available for various purposes. For example; when copper articles of elegant designs are manufactured at a cheap rate it will be found desirable to plate them at a corresponding price. Alloys of tin, nearly equal to silver in brightness, might be thus deposited on the surface of the copper, and manufactures surpassing in beauty of design and durability the ordinary plated goods now in use might be furnished at a cost little exceeding that of common perishable japanned-wares.

The application of the process of depositing copper on metallic surfaces might perhaps be rendered extremely useful in the protection of iron from rust. The iron bolts of ships, for example, if well coated with copper, might become as incorrodible as copper bolts; and numerous other instances will suggest themselves in which the protection of iron from corrosion by covering it with a film of copper might be advantageously adopted. It may not, perhaps, be carrying our views of the extent to which the galvano-plastic art may be applied beyond the regions of practicability to suppose that even ships may be coppered by electro-chemical action, without any manual labor and in a few days time! At all events we feel persuaded that this new process opens a wide and almost untrodden field for manufacturing industry, the value and importance of which cannot well be over-estimated.

APPLICATION OF ELECTRO-MAGNETISM AS A MOVING POWER.

The practical application of electro-magnetism as a moving power, which has been hitherto unsuccessfully attempted, notwithstanding the promising accounts of the performances of engines in America and elsewhere, is said to have been effected in Germany. We have before noticed the reported success of M. Wagner, for which public rewards have been granted. We now take from the *Allgemeine Zeitung* the following account of other experiments which have been exhibited at the Polytechnic Society of Leipsic.

"The meeting of our Polytechnic Society was rendered peculiarly interesting by a lecture given

by Herr Störer on his experiments in the application of electro-magnetism as a motive power. Herr Störer commenced his experiments several years ago, before Wagner's invention, and has procceded independent of it. By merely following up and carrying out the ideas of Jacobi, to whom the first merit of the discovery is due, he has succeeded in constructing a small machine, the power of which is as yet limited to the raising of only a moderate weight, and putting a turning lathe in motion, but which is nevertheless sufficient to render perfectly evident the whole mechanism of the important invention, and which, as the constructor observed, needs only to be enlarged to produce more practical effects.

"The principle of electro-galvanic movement has its source, as is well known, in the law of reciprocal attraction and repulsion of two iron bars, surrounded by a galvanic current, and thereby magnetised. Herr Störer's machine consists at preseut of only two concentric circles of spiral iron bars, surrounded by conducting wires for the reception of the electric current. Each circle contains 12 single bars, placed at the distance of from two and a half to three inches from each other, the bars of the outer circle being about half an inch separated from those of the inner. The outer circle is fixed; the inner forms the periphery of a moveable disc, swinging wheel, or pinion. This mechanism is brought into connexion by two conducting wires with a galvanic battery, in such a manner that in the first place the bars of the one circle with positive electricity surround those of the other with negative electricity; then suddenly, by an arrangement in the conducting apparatus, the current is changed, and thereby electricity of the same kind is produced in both circles. The consequence of this operation is, that the opposite bars, in consequence of the different magnetic power communicated to them, first attract each other, then instantly becoming, by the inversion of their poles, similar magnets, with equal force repel each other. By this regularly-repeated alternation of attraction and repulsiou, each bar of the internal moveable circle is in succession drawn towards all the bars of the external fixed circle, and then driveu as it were back on the next, whereby the whole disc is brought into a state of uniform motion.

"The inventor makes a very moderate estimate of the cost of the machine. The expense consists chiefly in the wear of the zinc in the galvanic battery by the action of the acid; but as to the outlay for this article, it will be almost entirely counter balanced by the precipitate which in consequence of the operation is formed in the acid, and which yields a somewhat valuable chemical product. With regard to the power of the machine, and tho possibility of reinforcing it so as to produce greater practical effects, Herr Störer submits the following considerations:—The present machine, though only double the size of the one he first constructed, which had six pair of bars, acts with a six-fold increase of force. Each galvauic battery consists of a copper cyliuder, a zinc cylinder within it, and a chemical mixture by which they are connected. Now, as respects the effect of the number of batteries employed, Herr Störer makes the following observations, the accuracy of which he has proved by experiments:—'In the connections with a single battery the machine raises, with moderate velocity, 3lb.; with two batteries 13lb.; with three 25lb.; with four, 40lb. This is approximatively an ascending gradation of power in the ratio of 1, 4, 8, 12, whence it certainly would appear that the force might not be found to augment exactly in the relation of a progressive increase of the batteries.' According to Herr Störer's calculations, the connexion of a compound battery of 50 elements with a machine in cubical contents 26 times greater than the one exhibited would produce an effect equivalent to 50 horse power.

"Still, however, after all these data and calculations, there remain several doubts as to the practicability of the application of this invention to machinery on an extensive scale. On the other hand, the results obtained by the experiments hitherto made are of sufficient importance to encourage a spirited prosecution of the discovery, which is in itself so ingenious that it ought to be joyfully hailed by all who take an interest in the progress of civilisation, as a new triumph of the human mind over inanimate matter. At all events, we Germans have just reason to be proud of an invention the first idea of which came from a German, and all the improvements yet made in which are the offspring of German intellect and German perseverance."

ON THE METAL-CLEANSING PROPERTY OF A DOUBLE CHLORIDE OF ZINC AND ANTIMONY.

BY M. GOLFIER BESSEYRE.

There is a double chloride formed of joint equivalents of chloride of zinc and sal-ammoniac, easily crystallised, sometimes in plates and sometimes in prisms, according to the dilution or acidity of the medium, but always forming rectangular parallelograms, the solid angles of which are often truncated, so as to present hexagons very often of the diamond form, susceptible of increasing in every direction, and forming either hexahedral prisms or hopper-shaped forms, &c.—in short, it has a great tendency to crystallisation. It is very soluble; water takes up more than one and a half times its own weight at common temperatures, and three and a half times at a boiling heat. The solution is very rapid, producing great depression of temperature.

Heat decomposes it into hydro-chlorate of ammonia, which sublimes, and chloride of zinc, which dissolves. The most remarkable property of this compound is the facility it affords in tinning or coating metals. It is easy, by means of this salt, to cover copper or iron with tin, lead, or zinc; zinc with tin or lead; and even tin with lead, and the reverse. It appears to cleanse so well the metallic surfaces to which it is applied, that the metals form, immediately on contact, the alloy on which metallic coating depends; at least, it is thus that I explaiu this singular experiment—of coating a plate of tin by means of a plate of lead, and reciprocally a plate of the same lead with a plate of the same tin.

The advantages derivable from this are very great; the cheapness with which this substance may be procured allows of its common use. Some of the applications I have already made are—coating a sheet-iron kettle with lead simply, which has been in use about two months, for the crystallisation of fluids which contain an excess of sulphuric acid, without any alteration being discoverable; all the instruments employed with this kettle, whether of copper or of iron, were coated also by meaus of lead.

From motives of economy, I had several large vessels made of zinc, as well as covers of tubs and boilers, but very soon the united action of air and steam, of heating and cooling, deteriorated the vessels, and oxide of zinc came off from them in very thick plates. To have made them of tinned iron would not have comported with my views of economy, and, besides, commerce furnishes the material only in small sheets. I coated with tin the surfaces exposed to the injury, and I am at present well satisfied with the effect. This double chloride, I conceive, acts as a reducing substance, for I had a large sheet-iron stove in the laboratory so much corroded by oxidation, that in many places it had holes in it. I coated it with lead, and it has become like a new stove. It is the solution of this substance particularly that must be employed, for it is essential that the surfaces to be coated should be moistened so that the little cavities which oxidation has made may be exposed to its action. I mention this because several persons appear to adhere to the use of it in powder.

If we borax a piece with water holding borax in solution and suspension, its preservative action commences at the boiling temperature, for the water leaves borax over the whole surface of the piece to be soldered; but if we use it in powder, success is much more uncertain, for the powder first calcines, then melts into small drops, which leave intervals exposed to the oxidating action of hot air, and it is only at the temperature of bright redness that it spreads over the surface so as to facilitate the combination of the solder with a metal.
—*Ann. de Chimie.*

THE SLATES AND SLATE QUARRIES OF BELGIUM.

The commission appointed on the 19th Feb., 1840, for the examination of the indigenous substances of Belgium, made its first report, on slates, on the 10th ult. The commissioners visited almost all the slate quarries in Belgium and Fumay, in order to inspect the slates that are manufactured there, to examine those which are employed in the various buildings constructed in each locality, and to compare the specimens taken from the quarries with the slates which cover those buildings, to ascertain their durability by every possible means.

This report being very extensive we shall content ourselves with giving extracts from it relative to those slates which are mentioned as being best adapted for public monuments and for buildings required to last a long time. The report says that the grain of a slate of good quality, and calculated to last long, ought to be close and fine, and consequently shining, which is a quality generally sought for, and that they should be smooth and compact.

These qualities are met with in the slates of Herbeaumont and Geripont, but particularly in the latter. "The slate quarry of Geripont," continues the report, "is one of the oldest in the province of Luxembourg, but it is only since the year 1825, when it became the property of M. Collette, that it has been very generally worked. From two to three millions annually is the amount which is sold. These slates are generally of considerable thickness; their color is very deep blue, approaching to black, and they are interspersed with small brilliant specks.

"We have endeavored to ascertain what are the most ancient edifices covered with the slates of Geripont. We are informed that they have been placed for 90 years on the church of Assenais, and they are still in a very good state of preservation. We have seen them at Bertrix, on the roof of a house of M. Lefevre, formerly burgomaster of that commune, and we have received a certificate from the local authorities, which attest that this roof was covered at least 190 years ago with slates, taken from the slate quarry of Geripont; and that in 1820, the laths which supported the slates being rotten, new ones were obliged to be substituted; that the same slates were used again, and that they were in as good condition as if only just extracted from the quarry. In short, we have received, with two specimens of the slates alluded to, a certificate delivered by the burgomaster of Auby, and the oldest men in that community, which states that the slates which were placed on the church of the same place, built in 1633, have never been removed, and that they were brought from the quarry of Geripont.

"We sball conclude this report by some remarks deduced from the above considerations, which appear to us sufficiently well founded.

"Belgium is now in possession of a sufficient number of good slate quarries, to enable her hence forth to be released from the tribute she has so long paid to foreigners for this produce.

"The greater number of slate quarries are in the province of Luxembourg, to which may be added that of Oignie, (province of Namur), which may rival those of Fumay iu beauty and excellence.

"Should it be wished as a provisional measure, and till tho produce of the new slate quarries has received the sanction of experience, or till opportunity has been had of appreciating their quality, to give the preference, for public monuments and buildings, to any particular kind of slate, we can confidently recommend well chosen slates from Geripont, Herbeaumont, and Viel Salm.

"It is important that government should en-

courage and regulate, by every means in its power, the workiug of slate quarries, which ought to become a very interesting hranch of national industry."

VENTILATION OF MINES.

In one of the coal mines of Hainault, a trial is about to be made of the method of ventilation, that is considered by M. Gonot, engineer, superior to any that has bitherto been adopted. This method consists in heating the air by means of the steam from water, sent a height of two hundred metres up tbe shaft, by means of cast-iron pipes; the expense of which will not exceed 5,000 frs.

The *Fanal*, in noticing this plan, says it is liable to the objectiou that the steam before it reaches the mouth of the pit will be condensed, and fall down to the bottom of the tube. The writer proposes, instead of this plan of heating the air in the shaft by steam, to effect the ventilation of mines by mechanical means, by an Archimedes screw, in the same manner as adopted in Russia. In reference to this plan he states:—

"We should recommend a trial being made of an Archimedes screw, of large diameter, the worm of which should be formed of cloth. This very light machine would not cost more thau oue hundred pounds, and by applying to it a one-horse power, which would occasion a very rapid rotary motion, the air of tho deepest mines might be quickly exhausted. This apparatus, constructed by a very ingenious Russian general, named Sablowkoff, is used at St. Petersburgh, with great success, for the ventilation of buildings, for airing newly-built houses, and for drying cloth. This machine is composed of a simple cylindrical covering fixed on boards, on which is twisted a single turn of the Archimedean screw. Its whole length is scarcely so much as two or three metres, and its diameter being greater than that of the ventilating aperture at the top of whicb it is placed, its effect is superior to any thing which can be imagined. An apparatus a cubic metre in size, and performing 500 revolutions in a miuute, is able to extract from a pit 30,000 cubic metres of air in an hour.

"Justice obliges us to state, that many years ago M. Latoret, of Mons, mentioned to us his intention of replacing the ventilator with the Archimedean screw; but the idea of constructing it in cloth, and of giving the helix only one turn round the shaft, exclusively belongs to the Russian general."

THE BRITISH MUSEUM.

We extract the following from an able article in the *Times*, noticing the recent improvements in the British Museum, and commenting on some of the objects of peculiar interest in the collection:—

METEORIC STONES.

In the room which occupies the north-eastern angle of the building, one of those lately opened, is placed that large mass of meteoric iron which was given to the Museum by Mr. Woodbine Parish; it is part of the gigantic one which was found, and still remains in the plain of Otumba, in the district of Buenos Ayres, in South America; the weight of this portion of it only is 1,400 lb.; it is the finest specimen of its kind in Europe.

Various theories have been advanced to account for the formation of these substances; the hypothesis which supposed that meteoric formations, of which there are many specimens in this apartment, had their origin in our own planet, is now found untenable, and has been abandoned. The appearances of a thunder-storm and of a fire-ball have been ascertained to differ in various important respects, and it is in vain to allege that they are formed on the ground by the action of common lighting; that they have been thrown up from volcanoes is equally difficult to conceive; the ashes which are ejected during the eruptions of Vesuvius and Etna have, by reason of their lightness (?) been driven to a considerable height, but there is no power in nature that is known which possesses a sufficiency of projectile force to propel solid masses many hundred miles through so dense a medium as the atmosphere. It appears, therefore, likely that these phenomena derive their formation from other regions than ours. The hypothesis which has supposed them to be generated in our atmosphere is not attended with less difficulty; there are scarce any two persons who have supposed the atmospherical formation of the meteorlite that have agreed as to the manner of their formation. Laplace suggested the probability that they might be thrown out from the volcanoes of the moon; nor is it unlikely, as volcanoes have been discovered iu that planet, and a projectile force equal in power to that possessed by ours would be sufficient to propel fragments that might possibly reach the surface of the earth, the more especially as no atmospherical resistance would be encountered, the moon being known to possess none. It is demonstrated by calculation, that if a body ponderate be projected from the surface of the earth with sufficient force to give it a certain velocity, it will never return; seven miles a miuute is sufficient to accomplish this. From the moon tbe required velocity to produce such an effect is about four times as much as a cannon ball, so that though the probability may be against it, the supposition is far from impossible. It is, however, more likely that they are the fragments of comets, because those bodies are favorable to such hypothesis, as also that from their nature they are subject to violent chemical changes, and from the comparative smallness of their dimensions a fragment thrown from them with any slight velocity would never return from the mass to which it originally belonged, but would traverse the celestial regions till it encountered some planetary or other body sufficiently ponderous to attract itself. All the masses of native iron which have been found in South America, and also in Siberia, have been ascertained by Howard, Klaporth, and Chladni, the Russian, who wrote an account of the Siberian mass of iron, to contain nickel, and exactly resemble the iron found in the stones which have fallen from the atmosphere; there is not a donbt but they have the same origin, the more so as it has been shown by the above celebrated men that real native iron is distinguished from that of meteoric origin by tbe abscnce of nickel.

THE MAMMOTH.

Perhaps, of the numerous osseous remains of animal existence which are to be seen in the Museum, none are more worthy of attention than those of the orders edentata and pachydermata in tbese apartments, to the former of which belong the giant of them all, the megatherium, of which there are the jaws and tusks, some osseous parts of the frame, and casts of others, which, though forming but part of the whole, are sufficient to show the immeuse size of the animal: this is the mammoth of the antients; it has never been seen alive, nor with its organs in a perfect state in death. The almost entire remains of this animal were found in Siberia in 1799; it has a near resemblance to the elephant; some modern naturalists have asserted that it still exists in Siberia, but it has hitherto escaped all research. Its residence seems to have been confined to a liue in the northern hemisphere, extending fron Siberia to the river Ohio in the United States. The specimen from which these casts were taken when found, though not alive, was in a complete state of preservation, and from the power of the agent through whose action they were preserved almost any date might be assigned to their antiquity. The following is the account:— A Tonguse chief in the summer of 1799, when the fishing was over in the river Hena, repaired, as is usually the case, to the sea-side, leaving his family in their huts. He coasted along the shore in quest of the tusks of the mammoth, wben in the centre of a large block of ice he saw a huge shapeless mass which did not at all resemble the logs of driftwood often found there. He could not, however make out what it was, but returning to the same spot the following year he observed that the mass which he had seen the year before was freer from ice, but that there were two similar pieces by tbe side of it: these proved to be the feet of the mammoth. In 1801 the side of the animal and one of its tusks very distinctly appearing, he acquainted his friends witb his discovery; this created great commotion among all; an aged couple asserted that a similar monster had once been seen before, but that the family that had discovered it had soon become extinct; the superstitious report affected the health of the chief, aud drove him from his prize, but on his recovery he became more resolute, and determined not to relinquish the profit he might make of the tusks. It was not till five years after that the ice became melted sufficiently to disengage the immense animal, when it fell over on its side on a bank of sand. The Tonguse was contented with the tusks, which he took away, and sold for goods of the value of 50 roubles (about £11); tbe carcase was left to the wolves, bears, and foxes, he had, however, made a rude drawing of it previously, which represeuted it with pointed ears, small eyes, hoofs resembling those of a horse, and a bristly mane, extending the whole length of the back. In 1808 Mr. Micbael Adams, being at Zakoutsk, heard of the circumstance, and went to the spot. On his arrival he found the skeleton was stripped of the flesh, but was itself entire, with the exception of one fore foot; the vertebræ, oue of the shoulder blades, the pelvis, and the remaining three extremities were held together by the ligament of the joints and by strips of skin. It received some damage on its removal to St. Petersburgh, a distance of nearly 7,000 miles; the ears were preserved, and the pupil of the left eye was perfectly distinguishable: it was a male, and had a long mane, but neither tail nor trunk; the skiu was of a greyish color, and covered with red hair and black bristles; the weight of the head was 400 lb., the height of the animal was 12½ feet, the length full 18; the tusks were curved threoquarters of a circle; their position is different from those of the elephant, bending towards the body of the animal.

THE ETRUSCAN VASES.

Adjoining tbe Egyptian rooms containing the mummies is tbat in which the Etruscan vases are placed; perhaps there are but few relics of antiquity which deserve, and indeed attract, greater notice than these venerable remains of ancient art. They are curious objects of researcb, if considered only in relation to the fabulous or tbe real and early history of Greece; but beyond this they are subjects well worth the study of the artist, from the masterly style in which the legends are depicted. The ancient statues and sculptures which are the admiration of our day were many of them executed in times contemporary with these; as painting and sculpture have in the middle ages marched together with equal steps, these paintings are all that now remain for us to judge whether the sister arts at that time were coequal with each other. It is true that Dempster, Gori, Count Cayley, and others, havo looked upon them as but tbe first attempts of the art in its rude infancy, and that some of them are such cannot be doubted; but their being so gives them additional value in our day, as hriugiug to our view the alphabet, if it may be so called, which acted as the ladder of knowledge to those whose handyworks have been the admiration of 2,000 years. No material is so little subject to be damaged by the hand of time as pure baked clay, nor will it allow of any surreptitious addition to the original painting on it; in the collection here is a figure of Silenus, which has been represented as clothed, contrary to custom; it was detected by tbe application of water. Winkelman, and most of those authors who have written upon tbe subject, give them generally as the work of the Etruscans, and instance one in this collection on which Anti-

phates, King of the Læstrygones, is hunting a wild boar; his name is written over him, as also those of his companions, in the most ancient style of Greek character, in the mauner called Bestrephedon, which is known to have been disused in Greece 500 years before the Christian era; it was dug out of a sepulchre in the neighbourhood of Capua. They are almost always found in sepulchres, the most common of which are constructed of rude stones or tiles, with just room sufficient to contain the body and five or six vases, a small one near the head, and the others between the legs on each side, but oftener on the right than on the left; two are generally found in every sepulchre, but the size, quality, and number vary with the rank of the person entombed. In those sepulchres, which resemble small rooms, the body is found with its back on the floor with the vases placed around it, and others are sometimes suspended from the walls on nails of bronze; the more spacious the sepulchre the larger and more superior is the quality of the vase; though the painting on the small ones may be rude, the form and design are always elegant. The subjects of them all are mostly Bacchanalian. Neither inscriptions nor medals have ever been found in these tombs. In the time of Cæsar they were sought for as objects of curiosity or *vertu*, and, if so, they are valuable in the present age. To account why these vases should be placed in the chambers of the dead is, probably they were deemed sacred, and having been used for religious purposes, were placed by those who had been introduced into the religious ceremonies of Bacchus, to which the subject of the painting most frequently refers. It is from the slight drawings on the best of these vases that a correct idea may be formed of the genius and conceptions of the ancient Grecian artists, and of their facility in the execution of them; they alone are the only remains we have of ancient Greek design. It is certain that Raphael was fully sensible of their merit, for in a print of Marcus Antonius, from a drawing of that great master, he has introduced the figure of a dancing fawn, playing on a double flute, which is the exact figure on one of those in the Museum. It is difficult to suppose that the first artists were employed on them, yet on many the outline is so perfect, and the composition of the figure so easy and graceful, that they are hardly to be excelled. Winkelman says, these vases should be considered as the wonders of ancient art, as the smallest insects are the wonders of nature. With regard to the manner in which they were executed, it is not unlikely as to those which have yellow figures with a black ground, that the figures were first cut out of some thin and pliable substance, like paper, and then applied to the vase, after which the black varnished ground was laid on, and the outline of the figures intended to be painted remaining under the substance applied to the vase in the original color of the clay, was filled up with interior lines, according to the required subject, with a masterly hand, and with a pen or pencil dipped in the same black varnish which had been laid over the ground of the vase; the freedom displayed in the execution of these lines is admirable, and shows the most entire knowledge in the art of design. The figures are a treasury of ancient drawings; not having the advantages of shadowing they may be looked upon as statues placed near one another, for, with the exception of the particular relation which one may have to another which is next to it, it is isolated, and each forms a perfect whole. These ancient remains of genius are fitted for better uses than the pedant to display on them his learning; as copies of the original paintings of the ancient Grecian masters they are fit objects of study; perhaps Raphael never painted an earthen vase, though there are many falsely supposed to have been enriched with his hand, as those on the Urbino pottery; yet had age or accident destroyed all his works, one of those plates or vases would, to intelligent eyes, be sufficient to point out the merits of the original whence they were taken, and on a material that could not allow correction. Pausanias and other ancient authors mention paintings as celebrated in their time on subjects precisely the same as are seen in these vases; by studying the outlines of the many forms which are seen on them, the observer cannot fail to be struck with the sublimity of those whence they were taken. To attempt to give an explanation of the different subjects displayed on them would require a very great amount of classical knowledge; the greater part seem related to the legends and rites of Bacchus, as the figures and attributes, nine out of ten, are connected with his worship; many of the subjects are taken from the *Iliad* and *Odyssey* of Homer, or from the real or a fabulous history of ancient Greece; some in the collection represent gymnastic games, and we are told that the reward of a victor was often but the presentation of a simple earthen vase. The circumstance of the designs being better and more accurately executed on some of them on one side than the other, seems to denote that they were placed in some sacred depository and not intended to be moved, as vases in common use; some have no bottom, and such are always of a long and narrow shape. In studying them an opportunity is afforded of seeing how justly Winkelman has observed that the first grand style of the arts was formed from rules borrowed from nature only; afterwards, artists plunging beyond measure into the ideal, abandoned truth in their forms and worked more after the adopted system than after nature, of which they ought never to have lost sight; for art had by that means formed a particular nature of its own, which perhaps is the fault of the present age. Many of the designs on these vases would appear to have been executed when the grand style of art existed, and the natural grace in the actions and movements of the figures is admirable.

BRITISH PATENTS.

PATENT NOT SPECIFIED WHEN DUE.

HENRY KIRK, of Blackheath, gent., for *improvements in the application of a substance or composition as a substitute for ice for skating and sliding purposes*, due May 5.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 309.)

ALEXANDER JONES, of King-street, London, engineer, for *improvements in the manufacture of copper tubes and vessels*, May 10.—Claim.—The manufacturing of copper tubes, and of vessels, such as urns, cans, kettles, stew-pans, and the like, of the usual substance of such copper articles, wholly from copper, deposited, or thrown down, by the action of voltaic or galvanic electricity as herein described, upon moulds, such moulds not forming any part of the manufactured article when complete, but withdrawn therefrom by melting out or otherwise, according to the nature of the mould, when the copper tube or vessel is complete, and also the making of joints or joinings as herein described.

In order to manufacture articles according to these improvements, the patentee provides a mould of the form desired, which mould may be made of any non-conducting substance, or of lead, or any other metal fusible at a less degree of heat than the copper of which the article is to be formed. Should the mould be made of a non-conducting substance, it may be rendered a conductor of electricity by any of the ordinary methods (the patentee describes several methods, but lays no claim to the same), but if it is made of lead or other metal no other preparation of its surface is necessary after it has been moulded into the required shape or form, and smoothed or polished. The mould is put into a vessel containing a salt of copper, and surrounded by a cylinder of copper, of a larger interior diameter than the article required to be formed. A wire or slip of metal is then attached to each of these, in order that a communication may be made with a galvanic battery; the wire which proceeds from the mould that is to receive the deposit of copper communicating with the positive end of the battery, and the wire which is attached to the surface of the surrounding copper to be eroded, being attached to the negative end of the battery.

The communication being thus made, and the battery excited into action by any of the usual methods, copper will be deposited on the surface of the prepared mould, and this operation is to be continued until the article is formed, which will be in five or six days at a common temperature.

The following is the mode of joining tubes together:—The whole surface of the tubes to within 1-8th of an inch of the edges which are to be joined, are coated with a protecting varnish; these edges are then brought together, and made to communicate in the manner above described with a galvanic battery, which being excited into action will deposit copper on the part desired, and form the joint.

OTTO C. VON ALMONDE, of No. 23, Threadneedle-street, London, merchant, for *improvements in the production of mosaic work from wood* (being a communication), May 12.—The squares of wood which compose the mosaic work, after being coated with glue, are placed in a press and submitted to pressure on every side. They remain in the press until dry, and when taken out form a solid block, from the ends of which thin plates are cut off, and employed in the usual manner for forming the panels of floors, &c.

The glue made use of is not the ordinary cabinet-makers' glue, but another kind, which is made as follows:—A quantity of parchment chips are boiled in river water for several hours until liquid; this liquid is then strained off through a piece of linen, and the subsiding grounds thrown away. To the liquid parchment glue an equal quantity of cabinet-makers' glue is added, and they are then boiled together with white sugar candy and gum tragacanth, of each 1-32nd part of a pound to every pound of glue; but before mixing the two last-mentioned ingredients with the glue, they must be laid in water 24 hours to soak. When the above are mixed, the patentee adds to every pound of mixture 1-32nd part of a pound of isinglass, which has been first boiled in water and then poured into the glue. The glue is now made, but is improved by again boiling it, and then adding to every pound half a pint of copal, dissolved in spirits of wine, and poured in a boiling state into the boiling glue. After the glue has become cool it is thoroughly powdered, and is then fit for use.

JOHN HEATON, of Preston, Lancaster, overlooker, for *improvements in dressing yarns of linen or cotton, or both, to be woven into various sorts of cloth*, May 12.—This invention consists in warming the air, by which the yarn, when wet with the paste, or size, is to be dried in an apartment distinct from the dressing-room, and passing a current of this heated air into an open trough, placed on each side of the yarn beam, and just below it, so that the air shall pass through that portion of the yarn only which is ready to be dressed, and thus complete the dressing, after the application of the paste, and after the operation of brushing. The quantity of heated air admitted into the troughs is regulated by a valve at the bottom of each, by means of which it may be shut off altogether when requisite.

The current of hot air forced into the dressing-room is forced out through openings in the roof and sides of the room (for which purpose the patentee uses ordinary ventilators in the roof, and openings about a foot square in the side-walls of the room), whereby the damp warm air is passed off, and the dressing process is carried on with greater despatch, and with comparative coolness to the operators, and no water collects on the walls or roof by condensation

Claim.—The heating of air in a chamber, case, or compartment, apart from the dressing-room, and creating a current of that heated air, and forcing it

through that portion of the wet yarn requiring the same, in the process of drying, in such a manner as to dry the yarn, while the heat in the dressing-room is less oppressive to the operators than it is in the methods of drying usually followed; and also forcing the moist air created thereby out of the dressing-room through ventilators arranged for the purpose, and, when needful, stopping the supply of heated air.

EUGENIUS BIRCH, of Cannon-row, Westminster, civil engineer, for *improvements applicable to railroads, and to the engines and carriages to be worked thereon*, May 12.—Claim first.—The mode of regulating and cutting off the steam of locomotive engines, by applying apparatus to railways, to act on apparatus in connection with a valve, when the same are brought into action by the travelling of the locomotive engine on a railway, and without depending on persons travelling with the engine.

Claim second.—The mode of applying breaks to the wheels of locomotive engines and carriages, in such manner as to be brought into use by the travelling of the engines or carriages on the railway, and without depending on engineers or guards.

Claim third.—The mode of sounding a whistle in such manner as to be brought into action by the travelling of the locomotive engine on the railway, and without the aid of any person or persons travelling with such engine or carriage.

Claim fifth.—The mode of applying breaks, whereby two pairs of wheels are caused to move in opposite directions.

The following is the mode of shutting off the steam:—To the axis of the valve that regulates the flow of steam from the boiler to the engine is affixed one end of a short lever, the other end of which is attached by a pin joint to a crank affixed to the top of a vertical axis turning in bearings at one side of the engine; on the lower end of this axis is another crank, having a wheel or roller, which, coming in contact with a projecting bar (one of which is placed at every place on the line of railway where it is desired to cut off the steam), will cause the axis to turn round, and by means of the crank and short lever close the valve.

To this apparatus may be applied a means of sounding a whistle by the same movement as that which cuts off the steam.

One end of a connecting-rod is attached by a pin-joint to the handle of the plug of a steam-whistle, and the other end is attached by a pin-joint to the short lever above mentioned, so that when the steam is cut off the connecting-rod will open the whistle.

A light may likewise be exhibited by the same movement as that which cuts off the steam.

On the top of the vertical axis is affixed a cog-wheel, which takes into and drives a pinion affixed on the stem of a lamp, by which means when the steam is cut off the light will be exhibited.

The apparatus for cutting off the steam, sounding a whistle, and showing a light, may be constructed as separate apparatus.

The patentee likewise shows an arrangement by means of which the guide of a train can cause the stoppage of the next following train.

On the last carriage of the train is affixed a lever, by means of which the guide places the projecting bar in its proper position, so that it shall cut off the steam, &c., of the following train.

The following is the mode of applying the breaks to the wheels of railway carriages:—On the axis of each pair of wheels is a pulley, over which an endless strap or band passes in such a manner that when in action the power which is driving the carriage onward, and causing one pair of wheels to rotate in one direction, is the means of creating a tendency in the other pair to move in the reverse direction. The pulleys are each thrown into and out of action by a clutch-box, moved by two forks affixed to a horizontal axis which turns in bearings at each end of the carriage. From this axis an arm extends, which, when free, being pressed on by a spring, turns the axis partly round, the forks of which, sliding the clutch-boxes forward, throws the pulleys into action, and thus produce the effect above mentioned. A vertical axis, with a crank and roller at its lower end, similar to that before named, turns in bearings at one side of the carriage, having near its lower end a stud, which supports the end of the arm of the horizontal axis, but this axis, being turned round when the roller strikes the projecting bar, withdraws the stud from under the arm, which is now free to be acted on by its spring.

Breaks are applied to the peripheries of the wheels by a weighted lever, the weighted end of which is supported by the stud on the vertical axis, until the same is turned round, when the weighted end descends and applies the breaks.

JOHN ANNES, of Plymouth, painter, for *a new and improved method of making paint from materials not before used for that purpose*, May 16.—This invention relates to the manufacturing of paint from the following materials; viz., the sulphuret of lead, the sulphuret of antimony, iron pyrites or mundic, granite stone, gneiss, the elvanstone, felspar and quartz, by combining any one or more of them with the following ingredients, viz., water, sugar of lead, vitriol, and alum; and in respect to the first four of the materials above mentioned, the further combining them with hydrate of potash, sal ammoniac, and sulphuric acid.

The patentee makes a mixture of the following materials; viz., two gallons of water, eight ounces of sugar of lead, eight ounces of blue vitriol or sulphate of copper, eight ounces of grey vitriol or sulphate of iron, eight ounces of white vitriol or sulphate of zinc, and twenty-four ounces of alum; he then mixes 1 cwt. of any one or more of the materials first named, reduced to an impalpable powder, with as much of the mixture as will form a thick paste, and when well mixed levigates the mixture with two gallons and a half of linseed oil, employing any coloring matters to give the tint desired. When using any of the first four of the materials above mentioned, he adds four pounds of sulphuric acid, four ounces of hydrate of potash, and eight ounces of sal ammoniac.

The claim is generally to the mode of manufacturing paint in the manner described.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page* 311.)

THOMAS LAWES, of Canal-bridge, Old Kent-road, Surrey, feather factor, for *certain improvements in the method, process, and apparatus for cleansing and dressing feathers*, May 10.—Claim first.—The application of machinery to washing and cleansing feathers, by whatever mechanical arrangements the operation may be performed.

The patentee uses a long cylindrically-formed stationary vessel, having a horizontal shaft furnished with radial spokes or beaters mounted in bearings inside of it, such shaft being caused to revolve by suitable mechanism. A trough covered with a grating or sieve extends along the bottom of the vessel, the sides and ends of the vessel being likewise covered with wire grating.

The operation of washing the feathers is as follows:—The feathers are placed in the vessel, which is then filled with water, and the shaft being caused to revolve agitates the feathers, and effects the cleansing of the same; the dirt, &c., falling to the bottom of the trough. The feathers when clean are taken out of this vessel, and passed into a vessel containing hot water, in order to warm them, and are then pressed to get rid of the superabundant moisture, after which they are ready to undergo the process of drying.

Claim second.—The arrangement of apparatus for the purpose of drying and dressing feathers, and also the employment of two or more cylinders placed one within another, for the purpose herein mentioned, whether the said apparatus be employed in concert with the washing apparatus or without it.

The drying of the feathers is effected by placing them in a long revolving cylinder heated by a fire beneath it, but protected from the immediate action of the same by a semicircular shield. Affixed to the inside of the cylinder are a number of arms projecting towards its centre, and which by its revolution, coming in contact with the lumps of feathers formed by the washing, thoroughly separates the same. The steam arising from the drying of the feathers escapes through apertures in the side of the cylinder covered with a grating. The feathers when dry are removed from the cylinder by a door at one end.

The revolving cylinder may be placed within another cylinder, and the outer one exposed to the action of the fire.

WILLIAM M'KINLEY, of Manchester, engraver, for *certain improvements in machinery, or apparatus, for measuring, folding, plaiting, or lapping goods or fabrics*, May 10.—This invention consists of a machine for folding cloth.

On the bed of the machine a carriage moves, supported upon flanged rollers, which run upon a railway formed by the planed upper edges of the side-framing of the machine. The carriage is furnished with two bevelled boards or levers, hinged to a small upright at each end of it; their tapering edges being opposed to each other, they are used alternately over and under the cloth for the purpose of folding it. There are also two other bevelled boards or leaves which are hinged to the cross-framing at each end of the machine (in describing the operation of folding we shall distinguish these leaves by the Nos. 3 and 4, and the leaves of the carriage by the Nos. 1 and 2.) They are furnished with a piece of fish skin or other rough surface, and are employed for the purpose of holding the folded cloth. To the side frames of the machine are screwed slight standards, which support the guide-rails that conduct the cloth to be folded into the machine. The operation of folding is as follows:—The first fold being laid evenly upon the bed of the machine by the leaf 1, upon the first traverse of the carriage (a reciprocating movement being communicated to it), is held by the leaves 3 and 4, then, as the carriage returns, the leaf 2 falls, and, passing over the cloth, lays down another fold upon the bed, and, as the carriage runs up towards the end of its traverse, a catch pin fixed under it strikes upou a tappet, the tail-piece of which, acting upon a lever under the leaf 3, causes it to lift that leaf slightly upwards, in order to allow the cloth to be passed under it. Then upon the tappet being released the leaf 3 falls, and retains the folded cloth. The carriage now runs back in the reverse direction, and the leaf 1 falling, and passing over the cloth again, in its turn lays down another fold, which is passed under the leaf 4 in the manner above described in respect to the leaf 3. As the cloth accumulates on the bed, the same is caused to descend a short space by means of suitable mechanism, simultaneously with the folding operation.

CHARLES EDWARDS AMOS, of Great Guildford-street, Southwark, millwright and engineer, for *certain improvements in the manufacture of paper*, May 10.—Claim first.—The invention of gradually lowering the roll in the vessel known to paper-makers by the name of engine, by means of self-acting machinery, worked by the same rotary power as the engine itself, and which self-acting machinery can be regulated as to the velocity with which it acts upon the engine roll.

In the end of the water-wheel shaft an eccentric pin is inserted, which acts as a crank, and transmits motion through a series of rods and bell-crank levers to a horizontal lever, which hangs upon a pin fixed in the side of the engine. On this lever a pall is mounted, which takes into the teeth of a racket-wheel fastened on a horizontal axle, turning in a bracket attached to the side of the engine. On this axle there is a worm, or endless screw, working iuto a worm-wheel upon an upright shaft, on which shaft a screw-thread is cut, that works in a box or nut, which is either raised or lowered by turning the said shaft. A long lever is attached by a pivot at one end to the side of the engine, its other end being supported by the box or nut, and near its centre a sliding plummer-box, in which the axle of the engine roll is supported, has its bearings.

Mction being communicated to the upright shaft from the water-wheel shaft, by means of the rods, &c., will cause it to turn slowly round with an intermitting movement, and thus gradually lower the engine roll.

The speed with which the above-mentioned machinery acts on the engine roll can be regulated by lengthening or shortening one of the rods; this is effected by the rod being composed of two halves, joined together by a nut, cut with a right and a left handed screw, by turning which the rod is either lengthened or shortened; if the latter, the speed of the machinery is increased, and *vice versa.*

Claim second.—The combination of machinery herein described, or any modification of the same, which will regulate the quantities of pulp and back-water according to the speed at which the paper-making machine may be working, being what is termed self-acting.

The pulp from the first scoop-case is delivered by the scoops or lifters into a sliding shoot, which discharges it through a trough into the second coop-case. If the paper is required to be made thinner, the sliding shoot is moved forwards in the trough by a rack and pinion; it will thus be partly withdrawn from the action of the lifters, so that a portion of the pulp taken up by the lifters will miss being discharged into the shoot, and will fall into the bottom of the scoop-case again. The pulp and back-water may thus always be delivered into the second scoop-case in quantities equal to the speed of the paper-making machine.

Claim third.—The manner of working the pulp through the sieves by the action of the clapper, the sieves remaining quiescent; also the method of working the pulp through the sieves by pneumatical action.

The pulp is discharged from the lifters, or from the stuff-chest, into a compartment of the sieve-box, from whence it flows into the bottom of the sieve box under the sieves, which are stationary. Motion is then given to a wooden flap or clapper placed above the pulp, which is made air-tight to the box at its edges by leather or caoutchouc cloth; this clapper, being alternately raised and depressed, causes an undulating movement of the water and pulp, and aided by the pressure of the atmosphere, and the head of pulp and water in the box, forces them upwards through the sieves, from whence they run into a vat placed before the sieve-box ready to receive them. The grit, &c., is thus left behind in the box under the sieves.

Claim fourth.—The general arrangement by which the particular kind of curvilinear or undulating motion of the table is obtained, from the combined action of the vibrating levers.

In order to produce as nearly as possible that particular kind of shake or movement of the web and table given to the mould by the vatman, when making paper by hand on the old principle, the patentee supports the table at one end by a pair of rocking arms or bent levers, and at the other end by a pair of nearly straight levers, the lower ends of each pair being attached to a rocking axis; hence on a vibrating action being given to the levers the table receives its required shaking or rocking movement.

Claim fifth.—The use of small tubes perforated with holes, or with slots cut longitudinally, the tubes forming the table over which the wire passes; also the means by which the flow of water through the tubes can be stopped at pleasure.

In order to facilitate the discharge of the water from the pulp as it passes over the tube, and to enable what is called wet stuff to be used with convenience, the patentee fastens the small brass or copper tubes constituting the support of the wire-web to the side-frames of the tube, instead of allowing them to turn in the usual manner. These tubes are cylindrical and hollow, each having a row of countersunk or other holes along the upper part of the periphery; one end of each tube is closed, and its other end open, for the purpose of discharging the water. The open ends of the tubes are made conical, and are inserted into corresponding apertures in the side-frame of the table, along which side-frame there extends a tubular passage for the flow of water. Opposite the open end of each tube is a screw plug, which may be advanced if required to close the water passage of any or all of the tubes.

Claim sixth.—Any modification of levers, arms, rods, or chains, for bearing or supporting the frame of the table part of the paper-making machine, on which the pulp is formed into paper, when more than two bearings or points of support are used, and also when the side-frames carry all the rolls, tubes, &c., which belong to the wire table.

This part of the invention consists of an improvement on "Fourdrinier's Machines."

That part of the machine on which the paper is formed from the pulp consists of the usual parts, but in this instance the shake of the table is given in the same direction as the wire travels, instead of having a side-shake as usual in "Fourdrinier's Machines," and the end next the breast-roll, being lower than the couch-roll end of the machine, the table of wire will form an inclined plane, rising from the point at which the pulp flows on to the wire to the end nearest the rolls. The water will thereby have a tendency to run towards the lower end, while the pulp is carried up by the progressive motion of the wire-web, and hence the paper will be formed much quicker than in the usual way. The shaking motion is given to the table by means of four vibrating levers. All the rolls, tubes, &c., which belong to the wire-table, are carried by the side-frames.

Claim seventh.—The mode of heating the drying and other cylinders, by turning the air or vapor arising from combustion through the cylinders; also the equalisation of those vapors by the admission of common air, when used for the purpose herein described.

For the purpose of heating the drying cylinders, the patentee burns coal or coke in an oven or furnace, and conducts the hot air and vapors arising from the combustion into a suitable receptacle, provided with an air or other thermometer, which opens a valve for the admission of atmospheric air, on the heat of the vapors increasing beyond a certain extent. The vapors are conducted by pipes into the drying cylinders.

Claim eighth.—The flat sliding and quiescent presses; also the right to such presses, whether the moveable press works on guides, or in the arc of a circle, by a single lever or a combination of levers.

Instead of the usual gathering rolls, regulating the length of the sheet of paper when cutting the same, the patentee uses two presses or holders, one of which slides backwards and forwards upon a pair of guides, and brings the paper to the cutters, the length of its traverse regulating the length of the sheet; the other press, the lower clamp of which is at all times quiescent, holds the paper during the back traverse of the first press.

John Dockree, of Galway-street, St. Luke's, Old-street, Middlesex, gas fitter, for *an improvement or improvements on gas burners*, May 15.—The improvements in four-hole burners consist:—Firstly, in drilling two holes in the centre of the top iron-plate obliquely, and then drilling two other holes, one on each side of the centre ones, at right angles thereto, so that the gas rushing out of the side holes strikes on the side of the flame from the centre ones, and thereby causes it to elongate, and by that means to allow the flame to burn in what are called straight gas chimneys.

Secondly.—In the use of a cone to go under the gas holder, having one or two rows of holes perforated through it to admit the atmospheric air, and thereby make the combustion more complete. The hole in the top of the cone through which the flame passes should be one-half and one-sixtieth of an inch in diameter, and the cone should stand about half an inch higher than the top of the burner.

The improvements in argand burners consist:—First, in fastening on the top of the burner a blank plate of metal, and then drilling holes for the gas to pass out at. The centre part is drilled with six or more holes in a circular form, and one in the centre, to admit a sufficient portion of atmospheric air to make the combustion more complete.

Secondly.—In making circular caps or plates perforated with holes as above stated, and fitting them on to burners now in use.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 24th of July.

Joseph Hall, of Cambridge, grocer and draper, due July 14.

Walter Hancock, of Stratford-le-Bow, engineer, due July 14.

Pierre Armand Le Comte de Fontainemoreau, of Skinner-place, Sise-lane, due July 14.

Melcher Garner Todd, of the Island of St. Lucia, due July 14.

John Loach, of Birmingham, brass founder, due July 14.

William King Westley, of Leeds, flax-machinist, due July 14.

William Kenworthy, of Blackburn, spinner, and James Bullough, of the same place, overlooker, due July 14.

Charles Cameron, Esq., of Mount Vernon, Edinburgh, due July 14.

Samuel Hall, of Bowford, Nottingham, civil engineer, due July 14.

Edward Foard, of Queen's Head-lane, Islington, machinist, due July 14.

INVALIDATION OF PATENTS BY PREVIOUS PUBLICATION.

A case has recently been decided by the Tribunal of the Seine, in which the question involved was the invalidation of a patent by a previous publication of it by the inventor. The facts of the case, with comments, are thus given in the *Fanal*:—

"M. Dubrunfaut had made public a method of extracting potass from the molasses of beet-root, and finding that this method was capable of being rendered very advantageous, since sixty kilogrammes of potass can be extracted from a hundred kilogrammes of molasses, be subsequently took out a patent, the validity of which was disputed by M. Robert de Massy, who had already carried on this manufacture.

"The tribunal no doubt considered it a question of morality to decide the cause in favor of the inventor, rather than the manufacturer; for the law, in refusing patents for inventions already made public, does not make any distinction. This is an omission the tribunal has undertaken to remedy, and this appears to us to be just. But we could wish that the claim of the inventor should cease from the time his invention is practically applied by others, for to stop them in the midst of their manufacture is a serious injury. In such cases, the inventor ought to be bound, either to allow those who have commenced the manufacture to continue it, or to compensate them for the expenses incurred. But when the invention made public by the inventor has not been brought into operation by any one, it is reasonable that if he should wish to take out a patent the preference should be given to him.

"The following are the considerations which governed the decision we have announced:—

"Considering that Robert de Massy founds his demand on the forfeiture of the patent of inventions granted to Sieur Dubrunfaut, on the 19th of April, 1837, and of his patent of improvement of the 10th of November of the same year, only on the article 16, No. 3. of the law of the 7th of January, 1791, the terms of which are precise on this point, that every inventor, or, he who

calls himself such, who shall be proved to have obtained a patent for discoveries already printed and published, shall be deprived of his patent: Considering that *L'Agriculteur Manufacturier*, published in 1831, by Dubrunfaut himself, containing iu page 88, the idea of extracting potass from beet-root, does not contain an exact description of the principles, means, and process which constitutes the discovery; that the inventor, in fact, immediately adds, that, in one of his following numbers he shall give a further account of his notions of putting into practical application the extraction of potash: That this publication did not afterwards coutain a complete description of all the processes mentioned in the said patents, the construction of which forming the method of extracting the potass constitutes the discovery of the patentee: That not being able to separate the combination of these processes, or to touch one without destroying the whole, any more than it would be possible to annul these patents in one part and to establish them in others, it becomes evident that the effect of the publication in this journal cannot be to ostablish the proof prescribed by the law appcaled to, nor, consequently, to pronounce the forfeiture of the patent; still less, as no other work containing an account of the process described in the specifications of these patents has been produced: That the civil jurisdiction, exclusively confiued to that single question of forfeiture, would be incompetent to decide if there has been any infringement of the patents in the means used by Robert de Massy: For these reasons the tribunal declares the demand of the plaintiff for the above pateuts to be without foundation, and condemns him to pay the expenses of the process."

FOREIGN INTELLIGENCE.

FRANCE.

CONSUMPTION OF PARIS.

The consumption of Paris during the last month was 6,058 oxen, 1,898 cows, 6,110 calves, and 36,441 sheep, beiug an increase over the corresponding month of last year by 170 oxcn, 902 cows, 651 calves, and 7,881 sheep. This result is very extraordinary, not only in the increase, almost unprecedented in amount, but it has occurred notwithstanding the high prices which have of late prevailed; meat never having been so dear as it was in April, when the average price of oxen in the market was 75 centimes the half kilogramme. The *Commerce* explains this, with sufficient probability, by referring it to the great number of strangers who have recently flocked into the capital.

THE WELL OF GRENELLE.

It is stated in the Paris papers that M. Mulot has completed his preparations for fixing the copper tube intended to direct the ascension of the enormous mass of water from the Artesian well of the abattoir of Grenelle, so as to render the spring as powerful and continuous as possible. This tube which is of a couical form weighs 10,000 kilogrammes. It is composed of 49 separate tubes, forming altogether a length of 440 metres. Consequently it does not reach the source of the water by a distance of 123 metres. The tube is tinned within and without. In order to prevent the tin from being decomposed or from being acted on, and to prevent its being affected by galvanic actiou, M. Mulot has added to it a composition of caoutchouc. According to the calculations made with respect to the ascensional force of this volume of water, comparing it with the form of the tube intended to direct it, the jet of water thrown out by the Artesian well at Grenelle after it has arrived at the top of the tube will exceed fifteen metres. Thus the height of this jet added to that of the tube issuing from the ground will produce a flow of water of about three metres in diameter; which will fall from a height that exceeds that of the buildings of the abattoir of Grenelle by fifteen metres. It has been decided that M. Mulot, jun., should be employed to make a similar well in the Jardin des Plantes. This new sounding will be of still greater depth than the abattoir of Grenelle. It will be continued till water is found of 31 degrees of heat (centigrade scale).

THE WEATHER IN PARIS.

The heat of the beginning of the month, which had for some time yielded to cooler temperature, is appareutly returning. At four o'clock, on Monday morning, M. Chevalier's thermometer was at 10 8-10th of the centigrade scale, $51\frac{1}{2}$ Fahrenheit—by seven o'clock had risen to 16 5-10th C., $61\frac{1}{4}$ F.; at mid-day reached 24 C., $75\frac{1}{2}$ F.; and at two o'clock 25 3-10th C., 77 3-4th F. On Tuesday there was considerable heat, with showers of rain the whole day.

STEAM-ENGINES AND STEAM-VESSELS.

The Minister of Public Works presented to the Chamber of Deputies, on Saturday, an account of the labors of the mining engineers during the year 1840. The account relative to steam-engines is curious, inasmuch as it affords some idea of the extent of the steam-power of France. It appears from this document that there were, in the country, 159 establishments, which were provided, in 1839, with steam apparatus, containing 5,100 boilers, of which, 1,789 were used as heaters and 3,311 as moving powers: besides 2,547 engines, constituting together a force of 35,779 horses. France possessed, in 1839, 225 steam-vessels, or 63 more than in 1838, exclusive of those belonging to the Government. Those 225 vessels belonged to 20 Departments. The propelling apparatus consisted of 300 engines of 34,000-horse power. The number of passengers carried by those vessels, in 1839, amounted to 1,969,905, presenting an increase of 551,716 as compared with that of the preceding year. The goods transported by them did not exceed 60,970 tons. The locomotive engines, used on the railroads of the Departments of the Seine, Rhone, Gard, Herault, and Loire, were 88 in number, and represented a power of 2,471 horses; 25 of them were of French manufacture.

M. Arago commenced his course of lectures on astronomy last Saturday, and such was the anxiety of persons who had come from all quarters to hear the learned professor, that more thau 4,000 persons were unable to obtain admittance.

BELGIUM.

ROYAL ACADEMY OF SCIENCES AND BELLES-LETTRES, AT BRUSSELS.

At a recent meeting of the Academy, the gold medal was awarded to M. Naméche, professor of rhetoric at the university of Louvain, for his memoir on the life and writings of Jean Lonis Vivès, professor of belles-lettres at Louvain, one of the most celebrated savaus of the sixteenth century.

At the same meeting, decisions were pronounced relative to the papers sent in answer to the following questions proposed in the scientific class:—"to determine by experiments if metallic poisons, such as white arsenic (arsenical acid), ploughed into arable land, has power to affect every part of the vegetables that are produced on it, and among others into the ears of the corn, and if the public health would be endangered by spreading arsenical acid and other analogous poisons on the ground, in order to destroy noxious animals." Two papers on this subject were sent. The Academy awarded silver medals to the authors, who are M. Louvet, professor of chemistry at the school of commerce in Brussels; and to M. B. Verver, a student in science and medicine at the uuiversity of Groningen.

A paper had been received on the theory of the formation of odors in flowers; but it was not considered deserving a medal.

The question stated as follows:—"to make public and to discuss the most convenient method of establishing in inhabited places a ventilation adapted to their circumstances, and at the proper degree of temperature that ought to be preserved;" produced two papers; the prize, however, was not awarded to either. Two other questions, iu the same class, were stated thus:—"A paper on mathematical analysis, the subject of which is left to the choice of the competitors,"—and "what was the condition of the schools and other places of public instruction in Belgium, from the time of Charlemagne to the end of the 17th century? what were the branches of education taught there, the methods adopted, the elementary books that were used, and what professors were the most distinguished at different periods?" Each of these questions was the subject of a separate paper. No decision was made with respect to the first; and the second did not appear satisfactory.

To all the other questions which had been proposed no answers were returned.

The following among other questions were proposed as the subjects of prize essays for 1842. "To examine by new experiments and observations the influence which appears to be exerted on crystalline bodies by the quality and temperature of the media in which they are crystallised." "To develop the theory of the formation of odors in flowers." The author is required to determine the particular organs by which the odors are produced; and to state the auatomical structure and functions of those organs; to examine the mode of exhalation, and especially to ascertain to what cause it is to be attributed that some flowers are odoriferous at certain hours of the day and devoid of smell during others. Another physiological question of importance is the theory of digestion; the prize is offered for a microscopic examination of the chyme, and to determine the relation which subsists between the parts composing the chyme and certain aliments, such as albumen, gelatine, milk and its products, &c. The examination of the state of human knowledge respecting the electricity of the air, and the means employed at the present time to appreciate the electrical phenomena of the atmosphere; and the question of ventilation, more particularly as regards the ventilation of dwellings, are also prize subjects proposed.

The annual dinner of the Royal Academy of Sciences and Belles-lettres took place on the 8th inst.; the greatest cordiality prevailed at this meeting, at which M. Nothomb, minister of the interior, was present, and Baron Fulck. The health of the Kiug, the patron of the Academy, was drunk with enthusiasm.

It now appears certain that a society has been formed for the establishment of Belgian colonies iu central America, and that the founders of this society, among whom are Count Felix de Merode, aud others of the nobility, have submitted its regulations to the government, in order to obtain the royal authority.

THE SUGAR QUESTION IN BELGIUM.

In Belgium the question of sugar duties has divided public attention, together with the excitement of a general election, the same as with us. The point iu dispute is—whether beet-root sugar, which now enjoys protection, should not be subjected to the same duty as foreign sugar. The discussions have brought to light an extraordinary fact. It appears that the experiments of M. Peligot have proved that potatoes coutain more saccharine matter than either beet-root or the sugar cane, and that millions of kilogrammes are now extracted from them, and sold at a price much below that of other sugar. The product is not quite perfect, not being crystallisable liko that made from beet-root or the sugar cane, and therefore it must be mixed with one-third of other sugar for use; but as the experiments are followed up it will probably soon be rendered perfect.

The Belgian Minister of Commerce has sent a circular to the Chambers of Commerce in the kingdom, announcing that the Brazilian government has refused to renew the treaty of commerce with Belgium, which expired on the 18th of April last

This resolution is said to have been taken provisionally, till the expiration of the existing treaty with England, which will end in November 1842, and, that until that period arrives, Brazil will not enter into any renewed treaties with either Belgium, France, or the United States. In the meantime, however, the trade is to be carried on on the same terms as were stipulated in the treaties that have expired.

[It is stated in the English papers, that the treaty will not expire till 1844.]

Twelve bulls, of the Durham breed, recently arrived at Antwerp from England, which had been purchased on account of the Belgian Goverument. Others were expected to arrive, as it is intended, with a view to improve the breed of cattle in Belgium, to facilitate the sale of animals of the Durham breed in different parts of the kingdom.

It is stated in a letter from Brussels, that a weaver at Moorslide, near Courtray, has succeeded in making a great improvement in the weaving of linen cloth, that promises to be of the greatest benefit, and to produce a complete revolution in the mode of weaving. The cloth produced is fine, thick, and beautiful. The principle of the improvement consists in a new application of the flying shuttle (*navette volant*).

For the last six years researches have been made in the department of Ardennes, to discover beds of workable coal, as it is supposed that the coal basin of Sanebruck must extend under that department. Several attempts have been made by sounding, but hitherto without success. M. Degonsée, an engineer, has recently undertaken the task, and has engaged to penetrate to a depth of 300 metres, keeping the bore of a diameter sufficient to enable him to penetrate to four or five hundred metres if requisite. The boring has already commenced.

GERMANY.

THE GERMAN LEAGUE.

The promulgation of the German League for twelve years was signed on the 8th inst. at Berlin, by the representatives of the ten states composing it.

The German League, as is well known, has a political as well as a commercial unity of action in view, and is gradually and slowly, though certainly, enlarging its circle and its influence.

Brunswick is on the point of joining, though there are difficulties which may postpone the arrangement for awhile, such as her frontier, which dovetails very much into Hanover, not being easily protected against the smuggler. They have attempted to draw a better line for this purpose, by ceding parts of Brunswick in exchange for parts of Hanover; but the King of Hanover will not assent to this. Were he out of the way, Hanover itself would soon join, for both his people and the League would be glad of it: the latter especially, as Hanover has no manufactures, and they would get the sea for a frontier.

The Hanseatic Towns would next be drawn into the vortex, and the temptation offered by the League would be, that they should retain the same freedom of trade within themselves which they now enjoy. The advantage to the League would be, that, unconnected, they would be smuggling depôts; united, they would assist in checking contraband trade.

Holstein, Oldenburg, and Mecklenburg would soon follow; and in five years, it is calculated, the union would be complete.

Our past policy has not only been injurious to ourselves, but also to those German manufactures which owed their existence to it, and which, as our system is now to be changed, will be ruined. The manufacturers here see this clearly, and are crying out already bitterly in their periodical, the *Gewerbe Blatt*.

In articles made of short wool they will stand their ground better, but their power-loom cotton works will be sacrificed. Less twist and more pieces will come from Manchester, to the great advantage of our weavers, dyers, printers, &c., whilst the poor Germans will suffer in a corresponding degree.

The Americans had their agent at Leipsic, a Mr. Dodge, threatening to raise the duty on German goods unless their duty on tobacco was reduced, and he has carried his point.

The first shopkeeper in Leipzic, one who buys of all nations the articles most in demand, says that formerly nineteen-twentieths of the goods he sold were English, but that now the case is reversed, one-twentieth being English and nineteen-twentieths the manufactures of other countries. The experience of a shopkeeper is a truer test than that of a merchant, who pays the inland duty on a great proportion of goods which are afterwards smuggled into Austria.—*Morning Chronicle.*

RAILWAY INTELLIGENCE, DOMESTIC AND FOREIGN.

Rise in Railway Fares. — The fares between Leeds and York have been raised since December last, in the first class carriages from 5s. to 6s., and in the second class from 4s. to 4s. 6d. The fares between Hull and Leeds were increased 1s. in the first class, 1s. in the second, and 6d. in the third class, at the same time. The advance took place after the transfer of the Leeds and Selby line to the York and North Midland Company, and the consequent abolition of competition between the two companies. Passengers are conveyed from Hull to Leeds and also from Leeds to York by a longer route—namely, by way of Milford, which route is said to be more pleasant, as the passage through a disagreeable tunnel is avoided. The transfer was expected to be beneficial to both the Leeds and Selby and York and North Midland Companies, and that expectation is now being realised. We do not see any ground for expecting a return to either the old route or the old fares. The fares between Hull and Selby have not been raised since the opening of the line in July last, nor does any part of the increased profits go into the revenues of the Hull and Selby Company.—*Eastern Counties Advertiser.*

Chester and Birkenhead Railway.—The adjourned half-yearly general meeting of the proprietors of this company was held in Liverpool last week, for the purpose of receiving the report of the committee appointed on the 10th of April, to inquire into the circumstances connected with the purchase and working of Woodside and Monks' Ferries, and also into the general management of the company. The report adverted in terms of approbation to the excellent manner in which the works on the line had been executed. The committee reported that £32,000, had been paid for Woodside Ferry, the lease of which would expire in 1856, and that it was a considerable loss to the company. Monks' Ferry had cost £25,000; it also entailed a heavy expense on the company, and at the time of its purchase, in 1840, Mr. Price had succeeded in establishing his sole right to convey passengers to Liverpool, although the right both ways being vested in the Woodside Ferry, no interruption to the traffic could take place until the termination of the lease in 1856. The committee recommended the purchase of Mr. Price's right in both ferries, by which the company would be enabled to connect their railway with the water side; the necessary funds for the purpose to be raised by the creation of quarter shares, of £12 10s. each, to be issued at £7 10s., payable in three instalments of £2, and one instalment of £1 10s. The proposition contained in the report was well received by the meeting, and it was understood that a special meeting would be called to take into consideration the propriety of its adoption.—*Liverpool Standard.*

In consequence of the directors of the London and Birmingham Railway Company having agreed to despatch a special mail train on the York and North Midland line, the passengers from the north of England will now be enabled to proceed throughout in the same carriages, without changing at Rugby.—*Derby Mercury.*

Railway Traffic, &c.—The following is the total amount of traffic on the several railways in England and Scotland (29 in all) for the last week, that is to say, up to the latest period to which the several returns are calculated, viz., total amount of passengers conveyed, 222,210. Total receipts (including passengers, parcels, carriages, horses, merchandise, &c.), £61,850.

Fleas in Railway Carriages.—A correspondent of the *Times*, who says he is a frequent passenger by the South Western Railway, complains bitterly of the attacks of fleas in the first class carriages, and feelingly calls for the adoption of measures to prevent their increase at all events, if not to effect their extirpation.

Conviction of a Railway Servant.—A man in the employ of the Glasgow and Paisley Railway Directors was on Thursday week convicted of being absent from his post, and neglecting to turn the points near the Glasgow station. He was fined five pounds, and being unable to pay, was sentenced to 30 days' imprisonment.

Disturbance at the South Western Railway.—Mr. Charles Goode, a member of the United Service Club, was charged at Union Hall on Wednesday, with having caused a disturbance at the South Western Railway terminus, at Nine Elms, by insisting on getting into an omnibus which was full. It was stated that he spit on one of the passengers who opposed his entrance, and he was obliged to be dragged out by a railway policeman. The defendant complained of being illtreated, and said he was first assaulted. The secretary for the railway, said the directors did not wish to press for the penalty on that occasion; and the defendant, on expressing his regret, was discharged.

Conveyance of the Dublin Mail.—On the 15th of next month the evening mail from London will be conveyed on the Chester and Birkenhead Railway, and reach the station before 6 o'clock in the morning. Her Majesty's steamers, instead of receiving it on the Liverpool, will receive it on the Cheshire side of the Mersey, and sail direct for Dublin. The mail and passengers from Liverpool will be conveyed on board in a steamer. Half an hour at least is expected to be gained by the alteration of the route of the London down mail.—*Liverpool Albion.*

RAILWAY ACCIDENTS.

Accident on the Eastern Counties Railway.—On Sunday evening, at ten minutes before five o'clock, an accident, by which an engineer on one of the trains received great injury, occurred on the line of the Eastern Counties Railway. The injured man is named William Cox. The up-train left Brentwood at four o'clock, on its way to London; it arrived at Ilford about ten minutes to five, when, owing to the "points" of the rails at the station not being properly shifted, the engine ran off the rails, and at the same instant the foot-plate, as it is called, on which Cox was standing, between the engine and tender, from the violent jerk it received, rose out of its place, and the poor fellow's right foot and leg were jammed between the foot-plate and tender with great violence. Fortunately the steam of the engine was immediately turned off, so that no other person was injured. When the same train went down to Brentwood, about an hour and a half before, the "points" were shifted in the direction in which the train was then proceeding, and not afterwards reversed, as they should have

heen, in readiness for the train's return. This culpable neglect on the part of those whose duty it was to see the points right led to the accident.

Fire in Railway Wagons.—On Wednesday, as the train which leaves Dundee for Arbroath at one o'clock, was proceeding eastward, about a mile from Dundee, the guard discovered a body of smoke issuing from one of the last of the wagons in the train, and on examination it was found that two wagons loaded with flax were on fire. It happened fortunately that there was a cistern near, where the engines are sometimes supplied with water; had it been otherwise, the consequences would have been much more serious. The burning wagons were speedily conveyed to this cistern, where the flames were easily extinguished, and the train continued its journey. The accident was produced by a burning piece of cinder from the engine alighting upon the flax.

FOREIGN RAILWAYS.

Railway from Valenciennes to Belgium.—The works on the railroad from Lille and Valenciennes to the frontier of Belgium, will commence immediately. We understand that those who have engaged to supply the bricks have received orders to begin their operations, and the directors have announced the contracts for the works to be constructed between Roubaix to the frontier from the branch of Lille. The sum to be expended on the works amounts almost to a million, to be distributed between nearly 10,000 metres on the line towards Valenciennes, and 5,000 metres towards Lille. This latter line although not half so long as that from Valenciennes will require a much larger sum than the other half. All the preparatory labors of the engineers are completed, and the government is quite prepared to advance all the money required. The branch from Valenciennes to Blanc-Misseron (not comprehending the entrance into the town, which is reserved and adjourned) will be finished and opened to the public in the month of July 1842, at the same time that the Belgian railroad, which is in active progress, will have reached the French frontier. This being at the most in fifteen months, it will be possible to travel from Valenciennes and to the Rhine on the same day, by a railroad which will form a communication with three kingdoms, France, Belgium, and Germany.—*Echo de la Frontiere.*

The railroad from Cracovie is advancing rapidly. It is said that the railroad from Varsovia to the Dwina will be commenced very soon.

The Strasburgh Railway.—A new branch of railway from Strasburgh has just been thrown open; it is that from Kœnigshoffen to Benfeld, 25 kilometres in length (six leagues and a quarter). Since the 1st of May there have been four trains daily from Strasburgh to Colmar, and the same number back again. The distance is about 70 kilometres. On that part of the railroad between Kœnigshoffen and Benfeld, which has just been opened, there are only two curves, and those of great radius. The gradients are only one millimetre per metre. We observe on that branch, says the *Courier du Bas Rhin*, a great number of difficult engineering works, particularly on the approach to Kœnigshoffen.

TO CORRESPONDENTS.

The letter of Mr. Dayrolles, *in commendation of the voltaic battery invented by the* Hon. Mr. Mullins, *would, in its present form, be considered by the Stamp-Office as an advertisement. We do not conceive that the article he refers to can in any way interfere with the claim of* Mr. Mullins, *whose battery is said to keep in action for several months, and the improvement alluded to as having been effected by* Mr. Bain *extends the action only to the comparatively short period of three weeks.*

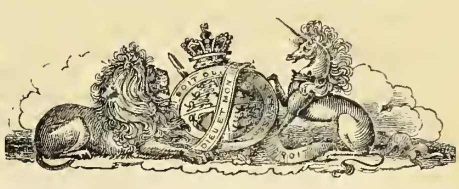
A Correspondent complains of the charge for catalogues to the National Gallery of Paintings. It would, indeed, be more in accordance with the liberal spirit on which this institution is founded, and the British Museum, *also, were each painting and object of interest described, as well as numbered, which would dispense with the necessity of a catalogue.*

The accident at Kensington from inhaling carbonic acid gas in a well, alluded to by "J. W.," *was noticed in our Journal at the time, with a recommendation of necessary precautions. The effect of drawing a carter's frock over the head before entering such an atmosphere, would be only temporary. The breathing through the fabric of the cloth, would not diminish the suffocating properties of the gas; the only advantage would be derived from the small quantity of air enclosed within it on entering.*

Gratuitous Copies *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of to-day.*

"The Inventors' Advocate" *is published every* Saturday Morning, *at* 7 o'Clock; and is regularly issued in Monthly Parts, of which 1 *to* 24 are now Ready.

"The Inventors' Advocate" is also published in Volumes, containing the Nos. of every 6 months.



THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, MAY 22, 1841.

We have on more than one occasion adverted to the question of protective duties on colonial produce, and to the questionable advantages derived, in a strictly commercial point of view, from our colonial possessions. The recent agitation of this subject in Parliament, and the great moral and political importance attached to its decision, has given the matter a fresh interest, and challenges a renewed consideration of its merits, apart from all bigoted or party views.

At the time this country made the sacrifice of twenty millions sterling, to purchase the freedom of the slaves in the British colonies, it was understood that the generous gift was to serve as an indemnity to the planters for any loss they might sustain from the increased price of labor. It was little contemplated that the English public, besides being taxed to pay interest on the loan of the twenty millions, was also to make good to the West Indian sugar-growers the increased price of labor by the greatly enhanced price paid for their sugar. Yet so long as the British possessions in the East and West Indies enjoy a monopoly of the sugar market at home, it is a necessary consequence that the loss from the deficiency of produce must be borne by the English consumer, and not by the colonial planter, who gains proportionally more by a diminished crop and higher prices than he would by an abundant supply and a glutted market. The plea for retaining the monopoly on the ground that the abolition of slavery has raised the wages of labor is, therefore, untenable. The complaint of the West Indian planters—that by the Act of the British Legislature the produce has been lessened, and that to deprive them of their monopoly on that account would be, first to cause the dearth, and then to punish them for it—though feasible, is not founded in truth, for they have received ample compensation for the calculated deficiency.

So long, indeed, as we maintained the monopoly of the colonial markets, and prevented the colonists from either buying or selling to foreigners, they had a claim to a reciprocity of exclusiveness. Bu it must have been felt, that when the proposition was lately made to throw open the trade of the colonies to foreign countries they could no longer with any degree of fairness claim the monopoly of supplying the British markets with their produce. When the principles of free trade were so far extended, it could not in justice be contended that the consumers in the mother-country should be hindered by prohibitive duties from purchasing

their commodities also at the best markets; for this would be voluntarily to establish a one-sided reciprocity to our own disadvantage.

The abstract proposition, that free trade should be extended to foreign sugars, seems founded on well-recognised principles of political economy, and to be based also on justice and expediency. The onus, therefore, lies on the opposers of that proposition to show that there exist circumstances in the relations of this country with our West India possessions which would render a measure, otherwise just and proper, a source of grievance and injury.

The arguments on which they rely are of a moral rather than a commercial character. It is asserted that it would be directly at variance with the noble example we have set of the abolition of slavery to encourage the system in its worst form in other countries, by the consumption of slave-grown sugar, to the detriment of the free-labor produce of our own colonies. The peculiar situation of the West Indies during the state of transition from a system of slavery to the habits of freedom is also urged as a strong reason for not disturbing the gradual settlement of the new relative positions between the planter and the freed negro. The commercial arguments advanced against the proposed measure are founded on the prospect of increased supply from the West Indies rendering the opening of other markets unnecessary; on the injury likely to result to our colonial trade; and on the supposed consequent diminution of British shipping.

The first of these objections does not appear to us to possess much weight; nor are the objectors practically consistent. Slave-grown cotton and tobacco are freely admitted without any scruples respecting the mode of their cultivation; it is only when the articles come in competition with the staple produce of our colonies that the objections are started, and it is made a point of conscience not to taste a lump of slave sugar, though slave-grown coffee is drank without hesitation. The fact noticed by some speakers during the late debate, that the West India planters purchase the cheaper Brazil sugar for their own consumption, is, if correct, overwhelming evidence against the objections arising from conscientious scruples. We are thus paying an extra price for an inferior article, in order to discourage slavery, whilst slave-produce is directly encouraged by those from whom the free produce is obtained.

The objection founded on the transition state of our West Indian colonies seems to rest on stronger grounds. After having effected as great a revolution in the state of society in our colonies as it is possible for any country to experience, it becomes the duty of the mother-country to adopt every means to facilitate the re-adjustment of conflicting interests, and to avoid any course that might embarrass a satisfactory settlement of the convulsed elements of society. Any tampering at the present time with the colonial system may therefore seem dangerous and inexpedient. On this ground, we are disposed to think the proposed change was ill-timed. The admission of foreign sugars on payment of a reasonable revenue-producing duty cannot be long withheld, especially if the colonists are permitted to trade directly with foreigners; but we ought, before throwing the markets open to foreign competition, to give the planters the opportunity of meeting the foreign grower on fair terms, and not to place the produce of free labor in the disadvantageous position of an unsettled and disorganised state of society.

The commercial objections founded on the prospect of abundant supply from the West Indies, and on the probable consequences of changing the exclusive system of colonial trade, we will not now enter into. As to the first, however, it carries with it its own refutation. If the supply be so abundant, the reduction of duty on foreign sugar would be inoperative; as our colonists would be able to undersell the Brazilian cultivator, and no slave sugar would be introduced for home consumption.

The effect of the determination of the House of Commons to maintain the prohibitive duties on foreign sugar, will, we feel convinced, be only temporary; the decision is founded on temporary circumstances; and when the planters and freed negroes have adjusted their differences and their relative positions, and the price of labor becomes settled and known, the commerce of the British possessions with the mother-country cannot be longer clogged with the monopoly system which it has been the labor of past years to remove in our commerce with foreign powers.

NEW INVENTIONS.

PETTIT'S ANTI-FRICTION RAILWAY.

The object of Mr. Pettit's plan of railways is, to remove the friction arising from the flanches of the wheels rubbing against the rails. He effects this by removing the flanches altogether, and the mode adopted for keeping the carriages on the rail is the application of horizontal guide-wheels, which are placed so as to act when required on an additional central rail. When the carriages are running in their proper position on the rails, these guide-wheels would not be brought into action; but on the least divergence or inclination on one side or the other, these wheels would work against the centre rail, and keep the carriages in their right path. It may, perhaps, be questioned whether the friction from these guide wheels would not nearly equal that arising from the flanches; but as regards safety, which is one of the important objects the inventor has in view, it appears that his plan offers great advantages. Allowing the central rail and the guide wheels to be of sufficient strength, it would be next to impossible for the carriages to be thrown off the rails, as the horizontal guide wheels are prevented from rising out of their line of direction by the rail being of the T form at the top. This railway would also have the advantage of affording increased facilities in moving in curves. Combined with this invention is the "railway controller," which we noticed in a recent number.

NEW PROCESS OF STEREOTYPING.

The following notice of a discovery which has been made at Brussels is given in the *Fanal*:—"Nothing could be more desirable than a less expensive method of taking correct stereotypes from printing forms, in order to preserve the composition of many important works. The following is the very simple process that is used:—The whole of the printing form is covered with blackened wax, that is rather soft. The superfluous wax is scraped off with a wooden scraper till it comes even with the face of the letter, then a dozen waste sheets of paper are pulled at the printing press to remove the remaining superfluous wax from the face of the letters. When the paper thus pulled ceases to be blackened, it is a proof that they no longer touch the wax, and that that operation is finished. The form is then placed in the galvanoplastic apparatus. The copper is deposited, and a mould obtained in copper which will afterwards serve to cast the type metal in. The stereotype plate being nailed on a wooden *cylinder*, can furnish 20 thousand copies a day by continued rotation. It must not be forgotten that the printing form must be covered with plumbago, which adheres to the wax, in order that the deposit of copper may be spread over all the form. This is made public to prevent any patents being taken out in Europe."

MACHINE FOR STAMPING COIN.

The following account of a new machine for stamping coins and medals is taken from the *Fanal*:—"M. Victor Capouillet, of Mons, has just obtained a patent for a powerful machine for stamping coin, the model of which has been exhibited for a long time in the ante-chamber of the Minister of Public Works, though it was not known for what purpose it was intended. It is quite on a different principle to that of the ordinary stamping press. In this machine a strip of rolled silver is applied, from which discs of metal are first punched out. These pieces are then placed within a proper ferrule, which mills the edge of the coin at the same time as the two faces are stamped. The piece then falls, and another succeeds it, while the remainder of the strip of metal continues to be advanced through its whole extent without being broken into pieces, but is only perforated. With a steam-engine of 10-horse power, this machine can strike 115,200 five-franc pieces in a day, or 180 millions in a year. One machine alone would be sufficient to coin all the money in Europe."

FLOATING CASSOON OR BREAKWATER.

We take the following notice of the floating breakwater from the *Sussex Advertiser*, published at Brighton:—"Capt. Taylor, the representative of 'The National Breakwater Company,' on Saturday morning submitted to our high constable and a select party of gentlemen interested in the welfare of this town, assembled at the White Horse Hotel, a model and proposal for laying down, at the expense of the company, a section of a new description of a floating breakwater constructed of timber, off the pier head, to protect the landing place, to show the advantage that such a work would afford by giving shelter to the pier, and allowing vessels to lay alongside of it at all seasons. If it should be found to answer the expectation formed, no one can tell what may be the result and the benefits that will arise from it, for it will not only obviate the many serious injuries inevitably occasioned by all the hitherto known breakwaters, but also supply the deficiencies that have so long existed on this as well as other parts of our coasts for the shelter of shipping, by forming and creating places of refuge for ships in distress. By the protection contemplated, steam packets will be enabled to lie within it at all times, instead of being obliged to go to Shoreham harbour every time they come over. Larger packets may also be employed upon this station, and they being impelled by more powerful machinery could make the voyage in less time than the present craft. They will also be enabled to continue on the station all the year round, instead of being obliged to abandon it from the middle of autumn until the latter part of the spring, as at present."

CONSUMPTION OF SMOKE IN LOCOMOTIVE ENGINES.

We have great pleasure in learning that the consumption of the smoke arising from coal used, not only in stationary, but locomotive engines, is now perfectly effected. A few days ago, the apparatus for attaining this important object was applied to a locomotive engine, "The Wizard," belonging to the Midland Counties Railway Company, and a trial, which proved highly satisfactory, was made under the inspection of Henry Youle, Esq., and William Hannay, Esq., directors of the company, and Francis Wright, Esq., of Lenton Hall, accompanied by several other gentlemen. This apparatus has been applied also to the engine of Messrs. Boden and Morley, lace manufacturers, Derby, and gives the greatest satisfaction. It is, we are

informed, the invention of Mr. Samuel Hall, who devised the important improvement in the manufacture of lace of what is termed "gassing," being the burning off the fibre of the most delicate fabrics of that article by drawing lines of the flame of inflammable gas through its interstices, by means of a species of air pump. Mr. Hall took out a patent in January last, for the first mentioned invention, under the title of "Improvements in the combustion of fuel and smoke."—*Nottingham Journal.*

SCIENTIFIC CORRESPONDENCE.

ON CRANK ACTION.

To the Editor of the "Inventors' Advocate."

Sir,—Your remark on my last letter was no answer to that letter. If you will read it over again, you will find that it was intended, first, to support my argument, that there is but very little, if any, loss of power in the crank action, when the connecting-rod acts on the crank constantly parallel to the piston-rod; and, secondly, to prove that the notions you entertain to the contrary are fallacious.

I now beg to hand you the result of my calculations when the connecting-rod is three times the length of the stroke, and *not* acting on the crank in lines parallel to the piston-rod, but according to the present practical arrangement; namely, one end attached to a beam on the cross-head of a piston-rod.

TABLE SECOND.

Degrees.	Resultant Forces. The power being =100 lbs.	Effective power on the Crank.
0·0	100·0000	00·0000
10·	99·9581	27·2651
20·	99·8374	53·6371
30·	99·6522	78·2666
40·	99·4245	100·3877
50·	99·1816	119·3452
60·	98·9528	134·6105
70·	98·7659	145·7850
80·	98·6438	152·5950
90·	98·6013	154·8830
100·	98·6438	152·5950
110·	98·7659	145·7850
120·	98·9528	134·6105
130·	99·1816	119·3452
140·	99·4254	100·3877
150·	99 6522	78 2666
160·	99·8374	53·6371
170·	99·9581	27·2651
180·	100·0000	00·0000
		1778·6674

$$\frac{18}{1778 \cdot 6674} = 98 \cdot 8148 \text{ mean effective power.}$$

This shows a loss of only 1·1852 per cent., and this loss, small as it is, can be reduced by extending the table to every degree; or, if a still greater approximation is required, to minutes. There is, however, one inquiry that I have not entered into in these calculations, which I am not clear does not compensate for whatever loss might arise from the angular direction in which the power acts on the crank, and which renders the *length* of the connecting-rod an element of no moment; that is, that long and short connecting-rods are equally effective, within certain limits. I allude to the increased leverage which the connecting-rod has on the crank, when compared with one acting in lines parallel to the piston-rod, consequent on its angular direction. This I will shortly investigate, and transmit to you the result.

I am, Sir, your obedient servant,

Norwich, 19th May, 1841. F. Ham.

Launch of the Southampton Indiaman.—The launch of this vessel took place on Tuesday at the yard of Messrs. Wigram, at Blackwall. This vessel is built of oak, and is modelled upon the plan of the recent improvements in naval architecture. She is 1,050 tons burden. Her accommodations are very superior, and of her class she may be pronounced one of the finest Indiamen ever built in this yard. She was in less than half an hour got into the East India Docks, where her masts will be stepped, after which she will be coppered, and her cabins, &c. fitted up.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(Contributed expressly to the Inventors' Advocate.)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING MAY 24, 1841.

Monday	Geographical Society	9 P.M.
	Linnæan Society (Anniv.)	1 P.M.
Tuesday	Medico-Chirurgical Society	8½ P.M.
	Civil Engineers	8 P.M.
	Zoological Society	8½ P.M.
	Royal Botanic Society	8 P.M.
Wednesday	Microscopical Society	8 P.M.
	Society of Arts	7½ P.M.
	Medico-Botanical Society	8 P.M.
Thursday	Royal Society of Literature	4 P.M.
	Royal Society	8½ P.M.
	Antiquaries Society	8 P.M.
Friday	Royal Institution	8½ P.M.
Saturday	Mathematical Society	8 P.M.

ROYAL INSTITUTION.

May 14. Friday Evening Meeting.

The Rev. John Barlow delivered a lecture "On the Use of Physiology in Elucidating Intellectual Science." The subject embraced an extended view of the functions performed by the nervous system in man and animals; and of the peculiarities observed on ascending the scale of animal creation as regards the exercise of voluntary and involuntary actions, the result of peculiar arrangements of different kinds of nervous filaments. In the opinion of the lecturer there are few men who do not ask or seek into the nature of how sentient beings exist; this necessarily leads them to the seat of animal life, which is found to depend on the nerves. These are composed of delicate fibres sheathed in a case, and taking their origin either from a cord or ring. They may be observed in those animals which rank the lowest in the scale, and from which the most approved methods of classification of the animal kingdom are founded. The *ganglionic* system appears to be that first met with among beings endowed with life; it is this system which controls the organs necessary for the functions of animal life. From *ganglia* or nervous masses filaments proceed to the heart, and viscera generally. By the exercise of their influence on the stomach and intestines the food is converted imperceptibly and unconsciously into the nutritive fluid. Other examples were recorded connected with the action of the ganglionic filaments on other organs.

He in the next place alluded to the nerves of *sensation:* these include the nerves of smell (olfactory), sight (optic), taste (gustatory), hearing (auditory), and touch. The possession of these in the higher orders of animals enables them to seek for food and to avoid danger. The nerves of *motion* were then noticed, which proceed from the brain, and are distributed over every part of the body, even to every muscle, bringing the whole under the immediate control of the will, at least to the extent of the distribution of their branches. The *white* or medullary matter, and the *grey* or cortical substance, of the brain were then alluded to. The blood vessels in the former were stated to be much larger in size than those of the latter, which are composed of small fibres interspersed with little grains. The *grey* matter was considered as the generator of action, while the *white* is only an actor. In man the grey matter is much more abundant than in the lower animals (vertebratæ), and in him the convolutions on the surface of the brain are greater in order to get a large quantity in so confined a space as the cranium.

Mr. Barlow alluded to the cruel practices in former times of dissecting animals alive in order to arrive more clearly and definitely at the functions performed in the animal economy, some of the results of which were detailed, such as the division of the trunk of the *Pneumo-gastric* nerve putting a stop to digestion and respiration. Among other facts mentioned in the discourse was that of a horse which had been accustomed to grind the ink in a mill of a large printing-ink manufactory, in this metropolis, six days out of the seven in the week. During the performance of its work the horse was continually moving in a circle in one direction, but on its being released on the other day into a field it was always observed to be walking in a circle, but, singular to state, taking the contrary direction to that which it had been accustomed to all the week. This Mr. B. stated was accounted for by a friend of his in the following way:—that the muscles and nerves on one side are cramped, and are more relieved by being exercised in another direction, than if they were altogether at rest.

He treated of a certain part of the brain as the organ of thought, and described its form and the mode in which the two hemispheres are united together by the Pons Varolii, as well as the course of the fibres distributed through its substance. An interesting case was mentioned, from the Guy's Hospital reports, of a boy who lost nearly the whole of one of the hemispheres from a fracture in the skull, the consequence of a blow received on being thrown from a horse. On his recovery, after the loss of such a quantity of brain, his mental faculties were not impaired, inasmuch as he could play chess and became a proficient in mathematical science.

Mr. Barlow was of opinion with others that there is no perceptible difference existing in the brain of civilised and uncivilised man; although some have endeavored to prove that the brain of the latter partakes more of the form of that of a baboon. He considered the difference was entirely dependent on the want of cultivation, for he stated that as muscular fibre can be increased by exercise it is but reasonable to imagine that the brain might be similarly affected. He recalled to the recollection of many the fact recorded of the Irish about a century and a half ago, when they were driven about by the rebels, that their faces became prolonged, analogous to those of the negroes. Several other points were noticed connected with the subject, which we have not space to record.

SOCIETY OF ARTS.

May 12. Illustration Meeting.

Mr. J. F. Goddard delivered a lecture "On Photographic Portraiture," in which he detailed the whole of the process, and exhibited a number of specimens illustrative of the art, and its applicability to the taking of pictures from the life. In a former number of our Journal,* a full report will be found under the head of the Royal Institution, and as Mr. Goddard did not reveal any further secrets on this occasion, we refer our readers to the former number for the description of the process in all its details.

CHEMICAL SOCIETY.

May 18. Professor Graham, F.R.S., President, in the Chair.

Professor Liebig was proposed as a foreign member; and Messrs. J. H. Gilbert, P. J. Chabot, J. Ward, W. Wegg, Professor Sylvester, and Dr. W. Gregory, were ballotted for and duly elected members. Messrs. Robert Murray, E. A. Parnell, and John H. Pepper, were elected associates.

A communication was read from Mr. Maugham, "On a Mode of Assaying Copper Ores." The process, which was explicitly explained, was considered to possess an advantage over the ordinary method, at least as regards the results obtained in arriving at the quantity of sulphur. A platinum tube was recommended by Mr. Maugham, in a part of the process.

The Chairman made some observations on the action of heat on platinum, and stated that the metal platinum had been observed to become very brittle, and even crystallised, when subjected to the heat of a furnace for some time, an effect which is not produced by the heat of a spirit lamp.

A translation of a paper was then read by Dr. Gilbert, "On the Atomic Weight of Carbon, by Professors Redtenbachter of Prague, and Liebig of Giessen." This paper had been forwarded to the Chairman for the purpose of laying it before the society. It was of a lengthy character, detailing

* No. 88.

he results made on analysing several chemical compounds abounding in carbon, with a view to arrive at the atomic weight of that element.

BOTANICAL SOCIETY OF LONDON.

May 7. J. E. Gray, Esq., F.R.S., &c., President, in the Chair.

A paper was read by Dr. John Lhotsky, "On the Characters, Botanical and General, of the Great Plains of New South Wales." Dr. L. is of opinion, that if all parts of New Holland, or even the greater portion, were merely composed of the vegetation of the *Eucalypti*, and, moreover, if this were to be associated with its geological character—that part of the world would appear to be one of the most arid, barren, and unfertile ever known. This is not the case, for in some situations adjoining the Alps, there are small plains and flats, stunted with a never-failing verdure, in which the *Podolepis* and *Caspedia*, as well as others of the Compositæ, grow to the extraordinary height of three feet. The present communication was entirely devoted to the vegetation of the plains, which were stated to be altogether devoid of trees on the eastern slopes and outskirts of the Alps, and extending to a distance occasionally of eight miles. The *Eucalypti* do not flourish here. There is a deficiency of *humus*, and these plains are composed of little else but a more or less fertile soil for several feet deep here and there. But even before the traveller proceeding southward has reached these plains, the entire character of the vegetation becomes much altered from what it is on the sea coast. The plains in the months of October and November, which is as it were the spring in the southern hemisphere, are most cheering and pleasing in appearance. Allusion was made to the particular genera of plants which give the peculiar character to the vegetation of these Alps at the season mentioned. These are met with until February or March, by which time the plants have become dried up and scorched by the continued rays of the semi-tropical sun; and at the end of summer these plains present a most repulsive and barren aspect. At this time it is that the colonists set fire to the vegetation, for the express purpose of producing an artificial kind of manure, with which the vegetation of the succeeding season is improved. He alluded to the burned or singed trees in the Australian forests. Owing to the very small quantity of rain which falls in these situations, and the very great temperature of the atmosphere, 120 degrees of Fahr., it has been asserted that spontaneous ignition takes place. This point led to much discussion.

Mr. Joseph Geiger, the curator, read a translation from the Dictionnaire Raisouné "on the Genus *Arachis*" and its employment in the arts and domestic economy. It is known as the *Earth-nut (Pistache de Terre* of the French). It is a remarkable fact, that the pods thrust themselves as they increase in size into the earth, where they deposit their seeds, and from this circumstance are called earth-nuts. On account of the abundance of oil in its pleasant-tasting seeds, it has been cultivated from a very early period in all the southern parts of the globe, and recently in the south of France. It is, however, only the *inferior* germens that are susceptible of fructification, which after impregnation bend themselves to the earth where they arrive at maturity. The *superior* germens are not productive.

Mr. Thomas Sansom read notes of an excursion to the Addington-hills and Keston-mark, in company with Mr. H. M. Holman, and noticed the most interesting mosses he met with in these situations.

Mr. Thomas Twining, jun., exhibited a new kind of apparatus for drying plants, which he considered to be particularly applicable for preserving succulent vegetables by heat; it was so constructed as to allow the warm air to pass around he plants to be dried, at the same time exerting a r op er degree of pressure on them.

INSTITUTION OF CIVIL ENGINEERS.

At the usual weekly meeting of this institution on Tuesday evening, several interesting papers were read. One from the Hon. Mr. Stewart, "On the Application of Peat to the Purpose of Building Sea Walls," excited considerable interest. The author described some embankments constructed with it on the estates of his brother the Earl of Galway, to reclaim various portions of land, to the amount of many hundred acres, and stated that it had been found to answer extremely well for several reasons, the most prominent of which were, that the blocks of peat, when well rammed down, grew together, thus forming a most complete "puddle" wall; and that from its spongy nature it was not liable to crack in dry weather like clay, when any portion of it was in water, as moisture was in that case drawn up to all parts of it.

EFFECT OF WIND ON SUSPENSION BRIDGES.

A paper "On the Effect of Wind on the Suspension Bridge over the Menai Strait, more especially with reference to the injuries which its roadways sustained during the storm of January, 1839," was read by Mr. W. A. Prowis, at a recent meeting of the Institution of Civil Engineers, and led to a discussion on the action of wind on suspension bridges in general. It was stated by Mr. Prowis that in the month of December 1825, when the original construction of the bridge was nearly completed, several severe gales occurred, and considerable motion was observed, both in the main chains and in the platform of the carriage-ways. It appeared that the chains were not acted upon simultaneously, nor with equal intensity; it was believed, therefore, that if they were attached to each other, and retained in parallel plains, the total amount of movement would be diminished. On the 30th of January, and on the 6th of February, 1826, some heavy gales again caused considerable motion of the chains and road-way, breaking several of the vertical suspending rods, and of the iron bearers of the platform. These bearers were constructed of wrought-iron bars, overlapping each other, and bolted together, with the ends of the suspending rods between them, for the purpose of giving stiffness to the structure. The flooring planks were bolted to the bearers, and notched to fit closely round the suspending rods, which were thereby held almost immoveably in the platform. It was observed, that the character of the motion of the platform was not that of simple undulation, as had been anticipated, but the movement of the undulatory wave was oblique, both with respect to the lines of the bearers, and to the general direction of the bridge. It appeared, that when the summit of the wave was at a given point on the windward side, it was not collateral with it on the leeward side, but, in relation to the flow of the wave, considerably behind it, and forming a diagonal line of wave across the platform. The tendency of this undulation was, therefore, to bend the bearers into a form produced by the oblique intersection of a vertical plane with the surface of the moving wave. The bearers were not calculated to resist a strain of this nature; they therefore were fractured generally through the eyes on each side of the centre foot-path, at the point of junction with the suspending rods, which being bent backwards and forwards where they were held fast at the surface of the road-way were in many instances wrenched asunder also. The means adopted for repairing these injuries, and for preventing the recurrence of them, were, placing a stirrup, with a broad sole, beneath each of the fractured bearers, attaching it by an eye to the suspending rod, cutting away the planking for an inch around the rods, and at the same time bolting, transversely, to the under side of the road-way, an oak plank, fifteen feet long, between each two bearers, for the purpose of giving to the platform a greater degree of stiffness, combined with elasticity, than it previously possessed. The four lines of main chains were also connected by wrought-iron bolts passing through the joint plates, and traversing hollow cast-iron distance pieces, placed horizontally between the chains. The effects of these alterations were so beneficial that little or no injury occurred for nearly ten years. On the 23d of January, 1836, a more than usually severe gale caused a violent undulation of the platform, and broke several rods. There can be little doubt that ten years' constant friction, combining with the shrinking of the timber, had relaxed the stiffness of the platform, and permitted an increased degree of undulation. The gate-keeper described the extreme amount of rise and fall of the roadway in a heavy gale to be not less than sixteen feet; the greatest amount of motion being about half way between the pyramids and the centre of the bridge. In consequence of the injuries sustained during this gale, the author and Mr. Rhodes were instructed to give in a report upon the state of the bridge, and on any repairs or additions which might appear desirable. The result of the examination was satisfactory; the whole of the masonry, the main chains, their attachments to the rock, the rollers and iron-work upon the pyramids, and all the principal parts of the bridge, were as perfect as when first constructed; it was, however, recommended, that "a greater degree of rigidity should be given to the road-ways, so that they should not bend so easily under vertical pressure." The bridge remained in the same state until the hurricane of the 6th and 7th of January, 1839. During the night of the 6th, all approach to the bridge was impracticable; the bridge-keeper, however, ascertained that the road-ways were partially destroyed, and he in consequence traversed the strait in a boat in time to prevent the down mail from London driving on to the bridge. When the day broke, it was found that the centre footpath alone remained entire, while both the carriage ways were fractured in several places. The suspending rods appeared to have suffered the greatest amount of injury; out of the total number of 444, rather more than one-third were torn asunder; one piece, 175 feet long, of the N.E. carriage way, was hanging down and flapping in the wind; much of the parapet railing was broken away; the ties and distance pieces between the main chains were destroyed; the chains had resisted well, in spite of the violent oscillation they had been subjected to, to such an extent as to beat them together and strike the heads off bolts of three inches diameter. Means were immediately adopted for restoring the road-ways; and so rapidly was this effected, that in five days carriages and horses passed over, while foot passengers were not at any time prevented from crossing. The opinion of Colonel Pasley, "that all the injuries which have occurred to the road-ways of suspension bridges must have been caused by the violent action of the wind from below," is examined, and reasons given for the author's dissent from that opinion. The action of the wind upon the Conway and Hammersmith bridges, is next examined; and from the amount of oscillation observed in all suspension bridges, the conclusion is arrived at, that winds act strongly and prejudicially on the fronts as well as on the horizontal surfaces of the platforms of suspension bridges, and that the effect of winds is modified and varied by the nature of the country, and the local circumstances connected with each individual bridge. Although differing in opinion with Colonel Pasley as to the general cause of injury to suspension bridges, the author agrees with him in the propriety of giving increased longitudinal rigidity to their platforms, to prevent or to restrict undulation. He advised its adoption in 1836, and applied his plan of stiffening by beams in 1839. He preferred beams to trussed framing, on account of the facility with which the former could be increased in number, to obtain any requisite degree of stiffness, and because he feared that trussed frames could not always be kept firmly in their true vertical positions.

Mr. Cowper was of opinion, that the real cause of injury to suspension bridges was the vibration of the chains and road-way. The whole suspended part, when acted upon by the wind, became in some measure a pendulum; and if the gusts of wind were to recur at measured intervals, according either with

the vibration of the pendulum, or with any multiples of it, such an amount of oscillation would ensue as must destroy the structure.—Mr. Brunel agreed with Mr. Cowper in his opinion of the cause of injury to bridges, and with the propriety of applying brace-chains, for preventing the vibration. He then alluded to the introduction of lateral braces in the bridge designed by Mr. Brunel, sen., for the Isle of Bourbon. He had been at the Menai bridge during a severe storm, and had particularly noticed the vibration of the chains, with the accompanying undulation of the platform. The force of the wind was not apparently from beneath; it appeared to act altogether laterally. The chains were too high above the roadway; their vibration commenced before the platform moved; the unequal lengths of the suspension rods then caused the undulating motion. His attention had latterly been much given to the subject, on account of the Clifton suspension bridge, now erecting under his direction. The span would be seven hundred feet, and the height above the water about two hundred feet. He intended to apply the system of brace-chains at a small angle, to check vibration. To two fixed points in the face of one pyramid would be attached two chains, each describing a curve horizontally beneath the platform, touching respectively the opposite sides of the centre of the bridge, and thence extending to similar points on the other pyramid; there they were attached to two levers, the ends of which were connected with a counterbalance of about four tons weight appended to each; these weights would hold the chains sufficiently extended to enable them to resist the lateral action of the strongest winds, without their being so rigid as to endanger any part of the structure. By this contrivance, the platform would be kept firm, which was the chief point to be attained. In all suspension bridges the road-ways had been made too flexible, and the slightest force was sufficient to cause vibration and undulation. The platform of the Clifton bridge would have beneath it a complete system of trough-shaped triangular bracing, which would render it quite stiff. He was an advocate for bringing the main chains down to the platform, as at the Hammersmith bridge, and for attaching the bearers to the chains at two points only; when they were suspended by four rods, it not unfrequently happened, that the whole weight of a passing load was thrown upon the centre suspension rods, and the extremities of the bearers were lifted up and relieved from all pressure. The extent of the expansion and contraction of the chains was a point of importance. In the Menai bridge, the main chains on a summer's day would be as much as sixteen inches longer than in a winter's night. At the Clifton bridge, the difference under similar circumstances would be about twenty inches. The whole expansion of the back chain beyond the pyramids must be thrown into the suspended part. He would prefer having only one chain on each side of the bridge, and that chain much stronger than is usually adopted, but in deference to public opinion he had put two; he believed that they rarely expanded equally, and hence an unequal distribution of the weight of the road-ways upon the suspension rods occurred. A rigid platform would in some degree prevent this; but he had endeavored to lessen the effects of unequal expansion by arranging a stirrup at the top of each suspending rod, so as to hold equally at all times upon both the chains, and thus cause each to sustain its proportion of the load.

SCIENTIFIC MEMORANDA AND NOTES ON ART.

Mechanical Sculpture Electrotyped.—At the annual conversazione of Mr. Walker, the President of the Institution of Civil Engineers, last week, some specimens of mechanical sculpture by Cheverton were shown; among others busts of Drs. Dalton and Hutton. These exhibited a union of the two processes of mechanical sculpture and the electrotype. By the former an accurate copy of a bust of ivory, of marble, of plaster of Paris, &c., may be taken and reduced to any size, in a certain substance which Mr. Cheverton keeps secret. On the copy, by the ordinary voltaic method, copper is precipitated, forming a coating on the bust. When the substance of the bust is dissolved it leaves a hollow copper mould for the reception of another copper deposit. This latter, released by breakage, comes out a facsimile, on any scale, at pleasure, of the original bust. It presents, moreover, a highly polished surface, and by a short exposure to the atmosphere a beautiful bronze hue.

The Davy Lamp.—When Sir Humphry Davy invented his safety lamp, it was at first supposed, that, with this instrument, there was no danger to the miner in an atmosphere highly charged with carburetted hydrogen; but experience has proved that such is not the fact—that this instrument is not always a safety lamp; but there is, fortunately, a mode of rendering it perfectly so. The practical miner, who often understood the matter better than most philosophers, would describe this gas at times as the "fire-blast"—as the sudden rushing-in of a large quantity of carburetted hydrogen, and, when that was the case, the lamp had no safety whatever. When a fatal accident occurred from such causes in a mine, we were in the habit of saying that the miner must have carelessly removed the wire-gauze covering; but that degree of incaution was not necessary to produce an explosion. If we inject a stream of this explosive gas against one of the safety lamps, the wire would immediately melt, and inflammation or explosion follow. A very ingenious lamp had been contrived by a miner named Roberts, who passed round the metallic tissue in the centre a tube of glass or talc; the latter was best for the purpose, because it was not in danger of fracture from pieces of coal flying about. Above and below, Roberts placed three or four thicknesses of wire gauze; for it was found, that even two thicknesses reduced the danger, and three entirely removed it, of any explosion. But the lamp could not be enclosed at the sides with three thicknesses of the wire gauze, because then there would not be sufficient light for the miner, so the talc was used instead.—*Prof. Partington.*

Origin of Coal.—Regarding the much-disputed subject of the origin of coal, from plants growing on the spot or drifted, Mr. D. Milne, in his *Memoir on the Mid-Lothian and East Lothian Coal-fields*, favors the latter view, and mentions the occurrence of fish teeth and scales in the substance of the coal in the line separating the "parrot" from the "splint" coal, at Sir John Hope's colliery, near New Hailes. It appears, that marine shells, Lingula and Producta, occur, as in Northumberland, in the roof above the upper surfaces of some coal beds. The author suggests that the lower part of this coal-field, with limestones and marine shells, might be wholly accumulated under sea-water; but in the upper part, extensive beds of Unionidæ give the contrary impression, and thus bring that part of the Lothian field to the ordinary coal measure type, while the lower part is to be compared to the "limestone coal-field" of Northumberland.

Ehrenberg on Infusoria.—*Atmospheric air* is necessary for the existence of Infusoria, and especially the *Rotatoriæ*; it is, therefore, requisite that a small hole be cut in the cork of the bottle in which they are kept. The smaller species very soon die; those of the genius *Chlamidomonas* live five days under a layer of oil. The Infusoria can only live beneath the air-pump as long as there is a small quantity of air; the larger animalcules soon perish, when thus treated. *Oxygen* produces but little effect on Infusoria. A small proportion of *Nitrogen* added to atmospheric air, and transferred to a vessel containing infusoria, caused them to die after twenty days; and a small proportion of *Hydrogen* similarly added, killed them after seventeen hours. All *Chemical substances*, which do not change the composition of the water, exercise no influence over the Infusoria; not even the strongest poisons, if they are not more than mechanically mixed with it. The fresh water Infusoria are killed by a drop of sea-water, which, however, contains a large quantity of Infusoria. *Strychnia* destroys them, in the same manner as putrid water, by promoting an expansion. *Rhubarb* is swallowed without producing any effect. *Arsenic* was swallowed by *Hydatina senta*, but which animalcule did not die until some time after. *Calomel, Corrosive sublimate*, and *Camphor*, did not cause death until after some hours. *Wine* and *rum*, like *sugar*, destroy many of the Infusoria, which are found in drinkable water.—*Microscopic Journal.*

Spelter Paint.—The advantage of the Patent Spelter Paint over any other of the paints applicable to the protection of wood and metal is its adhesive quality; and in the case of metals it serves to produce a chemical change on their surfaces, and to operate in other ways than by merely forming an external coating. We have seen several specimens of this extremely useful composition which had been exposed to the action of acids, and had been submitted to the severest tests without injury. The property of resisting heat renders it suitable in many situations in which all ordinary paints would be of no effect whatever. It resists damp, and adheres to surfaces on which no other paint could be laid.

Sale of the Northumberland Coal District by Charles I.—A very curious document has within these few days been discovered amongst the ancient records at Guildhall. It is a contract between Charles I. and his privy council on one part, and the corporation of the city of London on the other, in which the King makes over in mortgage to the corporation several large tracts of crown lands in the counties of Northumberland, Durham, York, &c., for certain loans of money to him, amounting to more than £300,000 of the then currency. But the unfortunate monarch never having had the power of redeeming these lands, they became legally part of the city estates; and several years afterwards, finding that from their remoteness, and the nature of the soil, they were not very productive or profitable, the corporation disposed of the city interest in them to the ancestors of the present great coal-field proprietors, not, of course, having the slightest idea that they were throwing out of their hands the richest and most profitable soil in England, which would long since have produced them a net profit of above £400,000 per annum. The document is quite perfect, and is very well written. The King's signature, "Charles R.," is in a fine free hand, and the signature of the members of his council at the foot of the deed are easily deciphered, but are remarkable for the diversity of the hand writing. That of Buckingham's is quite different from the others; it is very free, but in good taste. The royal seal is affixed to the deed, and the seals of the signing privy councillors are appended likewise.

Cheese made from Potatoes.—Cheese, it is said, of an extremely fine quality, is manufactured from potatoes, in Thuringia and in Saxony, in the following manner:—After having collected a quantity of potatoes of a good quality, giving the preference to the large white kind, they are boiled in the cauldron, and after becoming cool they are peeled, and reduced to a pulp, either by means of a grater or a mortar. To five pounds of this pulp, which ought to be as equal as possible, is added a pound of sour milk, and the necessary quantity of salt. The whole is kneeded together, and the mixture covered up and allowed to remain for three or four days, according to the season. At the end of this time it is kneeded again, and the cheeses placed in little baskets, where superfluous moisture is allowed to escape. They are then allowed to dry in the shade, and placed in layers in large pots or vessels where they must remain for 15 days. The older these cheeses are the more their quality improves. Two kinds of them are made. The first, which is the most common, is made according to the proportions above indicated; the second with four parts of potatoes and four parts of cow or ewe milk. These cheeses have this advantage over every other kind, that they do not engender worms, and keep fresh for a great number of years, provided they are placed in a dry situation, and in well closed vessels.—*Bulletin de la Societe d'Encouragement.*

Improvement in the Manufacture of Carpets.—A plan has been adopted by Mr. Danks of manufacturing carpets, by dying the wool ingrain, by which means, patterns resembling those of the most beautiful Brussels manufacture can be produced. The object of the invention is to imitate the appearance of Brussels carpets, at little more than half their expense, and in this the inventor has been so successful, that it is difficult to distinguish the two kinds without close examination.

Zoological Society.—A special meeting of the members of the above society was held on Thursday at Willis's Rooms, King-street, St. James's, to take into consideration the present condition of the museum, and to determine on its ultimate destination. Lord Braybrooke was in the chair. The secretary read the report of the managers, by which it appeared that owing to the inconvenience of the premises in Leicester-square, and from other causes, the collections had been temporarily placed in apartments in Golden-square, where they at present remain. A correspondence had taken place with the trustees of the British Museum, relative to the reception of the society's preserved collections, and a proposal having been accepted, subject to certain restrictions, the meeting was called to decide upon the subject. Considerable discussion ensued, but a resolution was ultimately passed to the effect that the museum was a necessary and intrinsic part of the society; that, independently of its scientific character and the number and rarity of the specimens it contained, it would be derogatory to the dignity of the society to part with a collection, in many departments the most complete in Europe, the formation of which had been a labor of 15 years, which had been valued at £11,000, but which could not be again accumulated for a much larger sum; that 499 fellows had compounded for the annual subscription by payments to the amount of £12,860 on the security of the society's property; and that any abstraction from the entire amount would be a breach of faith, if made without their concurrence. Other resolutions were passed, after which the meeting adjourned.

VARIETIES.

The Committee on Banking and the Scotch Bankers.—The deputation from the bankers of Scotland, appointed to come to London pending the inquiry of the committee of the House of Commons on banking, have printed a report of their proceedings for distribution among their constituents. The majority of their number arrived before the 23d of April, and their first step was to obtain an interview with the chairman of the committee, to learn the course of proceeding, and the points of examination. At first there was some little difficulty in getting two witnesses examined, as the chairman said that Mr. Blair, of the Bank of Scotland, had been examined already, and that it was the intention to hear no more than two witnesses from Scotland. The difficulty was, however, got over, and there was no further obstacle to the appointment of Messrs. Anderson and Kennedy. While in London the deputation took every opportunity of making themselves acquainted with the prevailing sentiments in this metropolis, and complain that the operation of Scotch banking is but imperfectly understood, while they express their anxiety at the favor found by the project of "One Bank of Issue." This was the great object against which they had to contend, and, although they are not at liberty to publish the evidence of their witnesses, they have printed a written paper, which Mr. Kennedy wished to read, upon the effects of overturning the present system of Scotch banking, but which he was not allowed to do in consequence of a resolution of the committee not to receive evidence in that shape. In this paper Mr. Kennedy argues that the change would require 1 per cent. to be deducted from the deposits, to the great injury of the depositors. But the most important part of the report is an

expression of the satisfaction that the deputation have derived from their temporary association, and a recommendation that the connexion thus formed may not be allowed to expire when its immediate object is attained, but that there may be an organised association for the establishment of such regulations from time to time as may be conducive to the benefit of the bankers and community of Scotland. That such an association will be really formed, seems to be pretty generally believed among those who are well acquainted with the facilities for combination, as well as the disposition to combine, which exist in Scotland. If such is the case, and the committee of the House of Commons do no more than they have hitherto done, which seems at least probable, the only effect of its operations will have been to render the advocates of the present system stronger and more completely organised than before, and to cause the prospects of a change to be more remote than ever.—*Times.*

Scotch System of Banking.—We have learned from an authority upon which we are inclined to place reliance, that the Government have no intention whatever of interfering with the Scotch system of banking.—*Kelso paper.*

Colonel Pasley's Operations against the Wreck of the Royal George.—These are now going on with great activity under Lieut. Hutchinson, as the executive engineer. On the 6th inst. Mr. George Hall, of Whitstable, who was so useful during the last two seasons, went down for the first time, and slung some small pieces of wreck. The same evening Sergeant-Major Jones, with a party of 24 men of the Royal Sappers and Miners, arrived from Chatham, with nine riggers and seamen (engaged for the same service), in her Majesty's steam-boat Comet; and on the morning of the 8th corporal Harris and private Jones also commenced diving; the latter, who had no previous experience, promises well. The weather and tides at first were unfavorable; but considering the short time since the operations have been renewed, the progress has been satisfactory. The pieces of wreck recovered have been generally small, with the exception of four pieces of floor timbers, broken off short by the explosions of last year. On Wednesday the 12th instant, a large fragment, about twenty-four feet long, was got up, which, being nearly in the form of the letter *h*, must have been a prong beam, such as was used formerly about the main-hatchway of a first-rate. This was also broken off at both ends by the explosions of last year. Some fragments of gun-carriages, together with several shot and pieces of lead, have been got up. A number of small charges of 47lbs. have been fired to advantage; but we understand that Colonel Pasley does not consider that it will be necessary to fire any charges exceeding 700lbs. of powder in the course of the present season, but generally smaller ones will be used, and that, instead of puncheons made for the purpose, he will use puncheons, half-barrels, and tin oil bottles or cans, to hold the large, medium, and small charges proposed. On Thursday Corporal Harris went down and recovered the large iron monkey or ram of a pile-engine, that had been sunk at Spithead by accident in the attempt to drive a pile over the Horse Sand, as a station for the proposed survey of the anchorage, by Lieutenant Sheringham. This object has since been effected by Mr. Purdo in a different manner, by fixing a beacon over the same spot, sunk by weights attached to the base of it.

Coal at Port Philip.—In the *Port Philip Herald* of Nov. 27, 1840, there is a paragraph respecting the result of a search for coal, at the Western Point of Port Philip, under the auspices of the Government. The following is an extract from Mr. Cameron's report on the subject:—"No coal of any consequence was found near Western Port, the strata there being at such an angle of depression as to be totally unworkable. At and to the eastward of Cape Patterson the country is of a much more decided coal formation, and at the Cape, but beyond the reach of water carriage, it was found in such abundance and excellent quality that a 100 ton ship might have been loaded without the necessity of excavating. After travelling about 20 miles to the eastward of Cape Patterson, and about 60 miles from the entrance to Port Philip, through a country abounding with coal, Mr. Cameron came upon a magnificent bay about 20 miles in circumference, and, as far as he could judge, of sufficient depth to float vessels of the largest burden."

Fatal Mail-coach Accident.—On Tuesday afternoon an inquest, which had been twice previously adjourned, was concluded at the Cumberland Head Tavern, City-road, on the body of Mr. James Mottram, aged 55, a proprietor of the Leeds mail-coach, which was overturned on the evening of the 4th of February last, and the deceased died in consequence of the injuries he received by the accident. George Crouch, the driver of the Rockingham Leeds coach, said, he drove when the accident happened. He attributed it solely to the dangerous state of the road. Several persons stated there was not a day passed but some accident occurred. The jury returned a verdict—"That the deceased died from typhus fever, accelerated by a fall of the Rockingham mail-coach, produced by the imperfect and dangerous state of Goswell-street-road."

Ice in the Atlantic.—The navigation of the Atlantic has this year been obstructed by ice and icebergs in latitudes much lower than it is ordinarily met with. The Great Western steam ship in her last passage out was surrounded by and nearly hemmed in by a field of ice. Captain Hoskeu gives the following account of the ice he encountered:—"The first iceberg we saw was in latitude 43, longitude 48.30; and the last in latitude 42.20, longitude 50.0. I am quite sure there was an unbroken field of that extent, and from what I heard from Captain Bailly, of the American packet-ship United States, I have no doubt the field ice extended, with very little break, to latitude 40.30, where Captain Bailly fell in with it on the morning of the 18th. Several other ships also fell in with it in the same longitude, and were completely stopped, giving them an opportunity of killing seals, which were on it in great numbers. Some of the icebergs I estimate a little, if at all, less than a mile long, and from 150 to 200 feet high. This field of ice was in large masses, some of them not less than 20 feet square by 6 feet thick or more. The temperature of the water, when within two miles of the first iceberg seen, fell suddenly from 50 degrees to 36 degrees; air, 40 degrees to 36 degrees. When in the ice the water was 25 degrees, air 28 degrees; during the remainder of the night and the following morning the water was not higher than 30 degrees, nor the air higher than 32 degrees. Immediately after passing the last ice the water became 36 degrees, and the air 42 degrees." It seems most probable that the President was unexpectedly surrounded by ice, by which if not stove-in she might have been detained.

Committee on the Export of Machinery.—Mr. Emerson Tennent, M.P., was examined on Monday before the committee of the House of Commons which is sitting to inquire into the expediency of repealing the present restrictions upon the free export of machinery. His evidence had reference to the state and prospects of manufactures in the States of the Prussian League.

The Sound Dues.—A letter from Stockholm, dated April 28, says:—"The negotiations respecting the Sound duty continue, and the following points are said to be already agreed on. 1. Provisionally to reduce the duty on, *a*, twist, from 36 to 20 stivers per 100lb.; *b*, cocoa, from 24 to 6 stivers per 100lb.; *c*, coffee, from 24 to 8 stivers per 100lb.; *d*, blue and Campeachy wood, from 30 to 15 stivers per 100lb. The duties on cotton and pepper will also be reduced, but to what extent is not known. This reduction will be reckoned from the opening of the navigation this year, and what has been paid since that time is to be repaid. 3. The definitive revisal of the tariff of duties shall be made by commissioners of all the powers interested, who shall meet at Elsinore. 4. These commissioners will be instructed to fix the value of the goods, the nature of the ship's papers, the rate of commission, and all other regulations, and also the period for which the convention shall remain in force. 5. Four per cent. on the value of the merchandise is taken as the general basis of the new tariff.

Barilla.—From a Parliamentary return it appears that the total quantity of barilla on which duty has been paid for home consumption, from the 5th of April, 1834, to the 5th of April, 1841 (inclusive), amounted to 896,090 cwt., and that the net produce of the duty on barilla in Great Britain and Ireland during the same period amounted to about £58,537.

Coals, Cinders, and Culm.—Returns of the quantities of coals, cinders, and culm, carried coastways and exported during the year 1840, have just been presented to Parliament, from which it appears that the quantity carried coastways was 7,475,877 tons, and that 1.606,313 tons were exported, the duty received from which amounted to £6,978. The quantity delivered in the port of London was 2,566,809 tons coastways, and 22,188 tons by inland navigation. The following extract shows the quantities from the principal places of shipment:—

	Coastways. Tons.	*Exported.* Tons.
Newcastle	2,281,343	593,911
Sunderland	868,228	442,987
Stockton	1,367,532	132,842
Whitehaven	423,379	24,318
Newport	482,398	7,256
Swansea	460,201	33,089
Irvine	252,976	19,126
Liverpool		109,546

Of the quantity exported, 394,954 tons were sent to France, 205,757 to Holland, 126,779 to Denmark, and 121,391 to Germany.

Turnpike Roads Bill.—This bill proposes to enact, that no toll shall be demanded or taken for or in respect of any horse, ass, sheep, swine, &c., or of any wagon, cart, vehicle, or other carriage of any kind whatsoever, which shall only cross any turnpike road, or shall not pass above 100 yards thereon.

Mr. Stephenson's Lime Works at Amber Gate.—Mr. Stephenson has now commenced burning lime at these works, and is sending it to the different places adjacent to the North Midland Railway. In the course of a short time it will be conveyed to most of the principal towns in England. The kilns are built in a handsome and substantial form, standing from 30 to 40 feet above the surface of the ground. The limestone is procured from the village of Crich, about two or three miles distant from the kilns, on a tramway formed for that purpose. A short distance from Crich the tramway passes through a tunnel between 50 and 60 yards in length; a little farther on is an inclined plane, worked by a wheel, which lets down six wagons full of limestone, and draws up the same number of empty wagons. Nearly adjoining this is another inclined plane, which is uncommonly steep, rising at the rapid rate of one yard in three and a half, and is worked by a large drum, round which passes a wire-rope; a lever is attached to the drum, by which one man alone is able to regulate the speed of the wagons at pleasure, or stop them altogether. Two full wagons are let down and two empty ones are drawn up at the same time. The full wagons pass over the Cromford canal by a wooden bridge (elevated several feet above the surface of the water) to the top of the kilns. These stupendous works, when finished, will be of the most extensive character in England, or we may say in the whole world. They will, when complete, be able to turn out upwards of 200 tons of lime per day.—*Sheffield Patriot.*

Lime Tolls Exemption Bill.—This bill proposes to enact as follows:—That no turnpike toll shall be payable in respect of any horse, wagon, or cart, &c., when employed in carrying or conveying along any turnpike road lime to be used in husbandry, for the manuring, &c., of lands, notwithstanding any act now in force authorising toll collectors to demand and take tolls in respect of horses and carriages so laden as aforesaid; provided that in cases of leases or contracts made between trustees of turnpike roads and toll-collectors, &c., the trustees may make deductions for losses by exemption of lime from toll. The act is only to extend to England and Wales.

Steam Boats on the Thames.—The competition among the steamers has become so great, and their numbers have so much increased of late, that 17 vessels are daily engaged in conveying passengers between Gravesend and London. Some of them charge 2s. in the after cabin, and 1s. 6d. in the fore part of the steamer, for each passenger; others 1s. 6d. and 1s., and a few 1s. only all over the vessel; while the steamers from Blackwall to Gravesend convey passengers for 8d. each. 14 steam-vessels are engaged in carrying passengers between London and Greenwich, and a majority of them have lately reduced their fares to 6d. each; but the pier dues swallow up one-third of the fare, and it is doubtful whether the steam-boat companies will be able to continue the reduced fares for any length of time. Eight steamers are constantly running to and from Woolwich, and they will receive a great accession in a few days by the boats of the Watermen's Steam-packet Company. There are 16 small vessels belonging to different companies steaming away from morn till night above bridge, and on Sunday last they carried upwards of 55,000 passengers at 4d. per head, between the numerous piers from London-bridge to Chelsea. Some of them were shamefully over-crowded, and their appearance occasionally excited great alarm. It is suggested by a correspondent of the *Times*, that steam-boats should be licensed to carry a certain number of passengers, in order to prevent the dangerous overloading that now takes place on the river.

Weavers' Wages.—In the north of England the lowest paid class of weavers—that is, those engaged on work requiring little strength or skill, seldom earn more than 5s or 6s a week. A family of six persons, two of them employed, average about 7s 6d weekly. When three of a family are employed, their united weekly wages is only about 12s, the father perhaps earning one-half, and his wife and son or daughter the remainder. But instances are given of families of four or five depending upon the labor of one person, and where the whole income is not more than 3s or 4s a-week! At Ashton-under-Lyne, 483 families were visited, whose average weekly earnings amounted only to 4s 11½d. This is sufficiently deplorable. In Scotland, families are represented as earning, according to their number, 7s, 16s, or, where there are four or five at work, 20s a-week.—The linen weavers in Yorkshire earn about 7s 6d a-week each. Weavers employed on fabrics requiring moderate skill are paid at a somewhat higher rate. Their wages, in some instances, amount to 12s, 13s, or even 16s a-week, while women earn about a third less; but, from this sum, the expense of candle, dressing, and perhaps loom-rent, have to be deducted. Where strength is required, some further improvement in the rate of remuneration is observable. At a bolting-cloth factory at Wandsworth, the men earn 25s a-week, but out of this they have to pay for candles, &c., and also for the assistance of a boy in some parts of the work. At Diss and North Looham, in Norfolk, the net average wages, after deducting expenses, amounts only to 10s. At a sacking and tarpauling factory at Bristol the average wages of sixteen weavers, for two years, was 12s 7d per man. The average wages of sail-cloth weavers at Dundee, Arbroath, Aberdeen, Montrose, and Kircaldy is 8s 6d, or, with skill and steadiness, 10s. The Spitalfields weavers employed on waistcoat velvets, average 20s a week; weavers of broad and rich-flowered shawls at Norwich, earn about 25s a-week; those employed on the finest shawls at Leeds make from 24s to 28s; and in all similar cases, where superior skill as well as strength is required, the rate of remuneration is equally high. But this class of weavers are liable to be thrown frequently out of employment, so that their annual income is sometimes less than that of the inferior operatives. Almost all descriptions of weavers, however, complain of the irregularity of work. Their wages are at once low and uncertain. Mr. Austin, the Assistant Commissioner for the south-western parts of England, states that the inference from all his evidence is,—"That the weavers, taken as a body, are out of work one-third of their time!"—*Abstract of the Report of the Hand-loom Weavers' Commissioners.*

Turn-out of Weavers at Barnsley.—On Monday a turn-out of the workmen of Messrs. Taylor and Sons, drill-manufacturers, Barnsley, took place, in consequence of their employers requiring them to add an extra mark (five yards) to each bunt, at the scale price of 1839. The men paraded the streets to the number of 200, wearing reads and gears over their shoulders, in mockery of an army marching to battle. The workmen, it is said, had borne the extra work for some time, but struck at length in consequence of other manufacturers threatening to put it on if Messrs Taylor's hands continued to suffer it.—*Sheffield Iris.*

British Iron Company.—A meeting of the proprietors of the British Iron Company took place on Thursday. A statement was contained in the report read of the settlement of the matters in dispute between the company and Mr. Attwood. They have agreed to pay Mr. Attwood £350,000, and release him from all liability in the 200 shares which he held, in discharge of all demands he made upon the company. They have already paid him £200,000 and the remaining £150,000 is to be paid on the 1st of March, 1844, interest in the meanwhile to be allowed upon it at the rate of 5 per cent. They value their property, machinery, &c., at £823,604 9s. 7d.; stock in hand, cash and book debts, at

about £60,000; and the mineral production of their estates at £45,000 per annum. The meeting adjourned to the early part of June, which is the special meeting upon requisition at which is to be discussed the propriety of dissolving the concern, and at which also will be appointed a committee to investigate its affairs.

A Spanish Steam Frigate.—A steam-frigate has been built at Bordeaux for the Spanish government, and is just completed. She is of very elegant form, and is expected to prove a good boat; we have not heard what the power of her engines is. As soon as some guns, à la Paixhans, expected from England, arrive, the vessel will be ready to sail for a Spanish port.—*Galignani.*

Novel Application of Balloons.—The *Courrier de Lyons* says that some smugglers on the Swiss frontier have adopted the plan of conveying light parcels of valuable articles over the frontier line of customs stations by means of a balloon; they freight the aerostatic machine with a load of from 160 to 200 English pounds, and then, guiding it by a rope, take advantage of a favorable wind, and walk with their aerial vehicle into France.

New Export Trade.—The very extensive and profitable trade which has recently sprung up in the export of beer to tropical climates, may serve to indicate another article which would doubtless prove extremely welcome in the same quarters, if it could be profitably sent at a moderate cost. We mean the common subacid fruits of this climate—currants, raspberries, damsons, and so forth, in the form of preserves. If sugar were introduced into the British market as cheap as it might be, our market gardeners, cottagers, and fruit-growers generally, would undoubtedly find a very large and growing demand for their produce for export, as well as home consumption. The speculation has already been made with very considerable profit, but the high price at which alone the article can be offered, from the dearness of sugar, necessarily limits the consumption to a very small extent.—*Manchester Chronicle.*

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PATTERNS,—
27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17. (The last relates to patterns and *models.*)

PATENTS FOR INVENTIONS,—
2 and 3 Victoria, c. 67.

SCULPTURES,—
38 Geo. III., c. 71.

ENGRAVINGS,—
7 Geo. III., c., 38; 17 Geo. III., c. 57.

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8 Anne, c. 19: 12 Geo. II., (Booksellers' Act), c. 36; 15 Geo. III. (Universities' Act), c. 53; 54 Geo. III. (General Copyright), c. 156.

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THE ECONOMY OF HIGH PRESSURE STEAM-ENGINES.

There is great inconsistency in the statements generally made respecting the latent heat of steam, and its practical effects when steam is applied as a moving power. It is found, for instance, that the same quantity of heat is required to evaporate a given quantity of water, whatever he the degree of pressure under which the steam is generated. It is also inferred from experiment, that the same *weight* of steam, whatever be its density, contains the same quantity of caloric. Nevertheless, other experiments show that the latent heat of steam is the same at all densities. The two latter statements are consequently at variance, as will clearly appear by comparing the amount of sensible heat in high pressure steam with the amount of heat absorbed in a latent state by steam of the pressure of the atmosphere.

It has been ascertained that steam evaporated under the pressure of the atmosphere, and at a temperature of 212°, contains about 990° of heat of which the thermometer gives no indication; this *latent heat*, as it is termed, being requisite to retain the water in a state of vapour. The temperature of steam of two atmospheres of pressure, and of nearly double the density of steam of one atmosphere, is 250°. It is, therefore, only 38° higher than the temperature of boiling water, and if the latent heat of both be the same, the absolute additional quantity of caloric in the steam of greater density can be only 38°; whereas, if the same weights of steam contain equal quantities of caloric, the denser steam ought, in addition to the extra sensible heat, to contain a quantity of latent heat equal to 952°.

It appears from the result of some experiments we instituted with a view to ascertain the quantities of latent heat in steam and in spirit vapor, that the quantity of latent heat in high pressure steam, not only does not exceed, but is actually less than that contained in steam of the pressure of the atmosphere; and we were even induced to infer, that the amount of latent heat diminishes in proportion as the sensible heat increases. Before arriving at a general conclusion of this kind, however, the experiments would require verification, as our object was to arrive at general results rather than analytical accuracy. The experiments were made with a strong digester, capable of bearing a high pressure, and the water was heated by a powerful Argand lamp. The quantity of water operated on was fifteen ounces, which was 21½ minutes in being raised from a temperature of 50 to 212°. After it had reached the boiling point, an additional atmosphere of pressure was gained every threo minutes; the time required for each additional atmosphere diminishing in a small degree as the pressure increased. The heat communicated to the digester by the lamp was about 10° each minute. This was proved by various repetitions of the experiments, and as the pressure was doubled, trebled, and quadrupled in three minutes' time for each increase, and even less for the higher pressure, the quantity of heat absorbed could not have exceeded the amount of sensible heat which the steam of higher pressures indicates by the thermometer.

Assuming, therefore, that the same *volumes* of steam contain equal quantities of latent caloric, we must infer that it is much more economical to work engines with high pressure steam, than with steam of medium pressure; particularly where the property of condensation is not made available. For example, to obtain steam to balance the pressure of the atmosphere requires 180° of sensible heat above the freezing point, and 990° of latent heat, making the sum of 1170°, and the steam produced by this expenditure of heat will have no impulsive effect whatever; it will merely balance the atmospheric resistance. If the temperature be then increased 38°, another atmosphere of pressure will be obtained by that quantity of additional sensible heat, without the absorption of any caloric in a latent state. Tho pressure thus gained is a working power of 15 lbs. on the square inch against the pressure of the atmosphere. It is true, tho steam is twice the former density, and that to produce an equal volume of it twice the quantity of water must be evaporated, but it is evaporated in a denser form, and therefore absorbs, or wastes, only the same quantity of caloric in a latent state that the rarer steam required to fill the same space. At higher pressures tho advantages increase still further. An additional 23° will raise the pressure to three atmospheres, and produce a working power of 30 lbs. to the square inch; four atmospheres may be obtained by the further increase of only 18°, and five atmospheres by another of 15°.

We thus perceive, that though it requires 1208° of heat to produce a working pressure against the atmosphere of 15 lbs. on the square inch, the addition of 56° will treble the working power, and raise it to 60 lbs. the square inch.

It is evident from this calculation, that there ought to be a great saving of heat by working steam-engines at the highest pressure compatible with safety and with the heating power of the furnace. We know that this opinion is at variance with the proposition which has received the sanction of authority, that tho same quantity of heat must always be required to evaporate a given quantity of water; but we have shown that this proposition is inconsistent with others that have equal, if not better foundation. We conceive, however, that in order to render the non-absorbent property of high pressure steam available, it is essential that it should not be allowed to expand whilst in communication with the boiler. If, as we consider, the amount of the latent heat absorbed be proportionate to the volume, and not to the weight of the steam, a cubic foot of steam of four atmospheres of pressure, if it be allowed to expand to two cubic feet, whilst in communication with the boiler, will absorb and carry away a quantity of caloric, equal to the latent heat contained in the original volume of steam, more than it would have absorbed had it not been permitted to expand. It appears, therefore, to be of great importance to have the steam-pipes and the admission valves of such a size, that the least possible expansion of the steam may take place until the communication is cut off. This point is not attended to so much as it ought to be, and if the principle on which we rely be correct, it is a matter deserving most serious attention.

In our recent notice of the working of Cornish engines, it was stated that the pressure of the steam in the cylinder, noted by the indicator, was 27 lbs., when the steam in the boiler was 64 lbs. Now if expansion to this extent be permitted whilst the expanding steam is in communication with the generating steam, the latter will be robbed of heat to supply the latent caloric absorbed by the expanding volume of steam, and there must be a consumption of fuel, to keep up

a temperature in the boiler, that is not profitably employed.

The consideration of the absorption of heat by the expansion of steam, has induced many scientific men to deny that any advantage can be gained by working steam-engines expansively; because it is affirmed, that a quantity of caloric must be absorbed by the expanding steam, and that the loss of heat thus sustained exceeds any additional power that may be gained. If it were indeed the case that the steam as it expands, when cut off from the boiler, absorbs heat in proportion to its increase of volume, engines worked expansively would be attended with loss instead of with advantage, on the same principle, inversely, that we have explained the saving of heat by working with high pressure steam. We must, however, postpone the consideration of this branch of the subject for another occasion.

ON THE TORREFICATION OF WOOD.

BY PRINCE BALASCHOFF.

The forests of Belgium, like the forests of many other countries in Europe, have disappeared, though there are still some provinces that are tolerably well wooded. The scarcity of vegetable combustible has occasioned serious apprehension in those countries where the soil does not contain a substitute of other fuel, which in its turn will become more and more difficult to work. All inventions, the object of which is to diminish its consumption, are therefore of the utmost and of increasing importance.

For a length of time obstacles which appeared to be insurmountable prevented the direct use of combustibles in blast furnaces without previous preparation; which, either by the conversion of coal into coke, or by the carbonisation of wood, produced a considerable loss, but which it was known would be amply compensated by the future advantages resulting from the process. These difficulties are beginning to be removed. In England, the use of coal has for some time been substituted for coke; in Russia, where apprehensions of a scarcity of fuel can only be the effect of great foresight, wood has already been used with advantage in an unprepared state. In France, numerous processes have been contrived for the torrefication of wood in closed vessels. It is only five years since these methods were adopted in the northern departments, and they are now introduced in Belgium. These increase daily, which though sometimes, when considered in an economical point of view, have been unsuccessful, have always been attended with a very considerable reduction in the consumption of wood.

Let us for a moment consider the nature and use of this new combustible. Carbonisation, when effected in forests, expels the volatile substances contained in the wood, and assimilates it to a state of pure charcoal. The object of this operation is to reduce the maximum quantity of heating fuel to the smallest volume. In fact, the same weight of charcoal yields twice the quantity of heat that wood does. In quantities of equal size, the relative weights being from about 2 to 3, that of the calorific power will be from 4 to 3; thus the difference is considerable. But this concentration of heating power so necessary to produce the powerful effect of the blast furnace, is obtained only by a very considerable absolute loss, which results from carbonisation. The object of torrefication is to diminish this loss by making use of wood in its most favorable state. The first operation of charring the wood, when continued gently till a quarter of its weight is reduced, being merely to expel the aqueous matter without any other perceptible alteration, the loss in combustible material is scarcely anything; at the same time this operation is attended with the advantage of preventing the cooling effect occasioned by the vaporisation of water in the blast furnaces. In this state the wood is very dry. When the process is carried further, the matter distilled, containing very little water, is principally composed of combustible gases, which, like hydrogen and oxyde of carbon, would, when burning in the blast furnaces, have the advantage of emitting a great degree of heat, or would operate as deoxydising agents. Hence it would appear that the wood which has undergone the degree of torrefication already mentioned is the best adapted to use in blast furnaces. But this conclusion is modified by the important consideration of volume. The wood thus charred gradually in covered vessels, though it has lost a fourth of its weight, and is deprived of the greater part of its water, the diminution in its volume is scarcely a tenth part. When this slow method of torrefication is continued so as to cause the wood to lose as much weight as by the first operation, that is to say, till it is reduced to half its original weight, it is observed that the additional diminution of volume is at least double the first. If the process be carried still further the same ratio of diminution in volume is observed.

Let us now examine what have been the practical results of torrefied wood, or, as it is called in France, *charbon roux*. The more regular action of the blast furnaces and the diminution of obstructions in them, may be attributed to making use of torrefied wood; the iron appears also to be improved, especially when employed in castings. But the great advantage obtained by this new method consists in the very considerable diminution of the proportion of combustible necessary to reduce the ore, and to smelt the iron.

It may be admitted that the consumption of wood is generally reduced to 2-5ths by this process; examples may even be quoted which establish a still greater difference in the consumption of the combustible. Thus the furnace of Bièvres, supplied with charcoal alone, consumed 28 cubic metres of wood to produce 1,000 kilogrammes of iron; the same blast furnace, at another time, when supplied with torrefied wood, and a slight addition of charcoal, only consumed 10·40 cubic metres of wood to smelt the same quantity of iron. It must, however, be observed, that the proportion of 28 cubic metres exceeds the usual quantity, and that the enormous difference that is remarked in the consumption in the present substance is partly attributable to a different management in the blast furnaces; yet the difference stated was calculated after the experience of many months in the years 1832 and 1837. In some blast furnaces at Biesmerée, near Philippeville, the economy in fuel is attended with a slight diminution in the produce of the ore; the cause of this appears to arise from heated air being in general better adapted to torrefied wood, on the same principle that in England air heated beyond 300° has been found to be the only means of employing coals from the mine containing a third of volatile substances.

I will mention many processes adopted for the torrefication of wood. M. Fauveau first entertained the idea of rendering the flames issuing from the furnace mouth available for this object; his apparatus, improved by M. Beaudelot, at Havrancourt, has been described by M. Sauvage. Since the publication of this description, attempts have been made to torrefy wood on the spot where it grows, in order to diminish the expense of transport, thus preferring to make a fire for the purpose in the forest, rather than make use of the apparatus connected with the furnaces, which in their erection are always attended with considerable expense, as they require the erection of solid brick-work, independently of the blast furnaces. Besides, there are other methods of rendering the heat from the furnace mouth useful, and in many blast furnaces a great advantage is derived by diminishing the flame as much as possible. In fact, by a recent ingenious discovery, the gases which escape from the furnace mouth may be used at the surface of the ground; they are cooled and conducted by a ventilator, to a place where they can be burned with advantage.

Another apparatus, yet little known, is remarkable for the regularity and uniformity of the torrefication which it effects. It was first established at the manufactory of Phade, in the department of Ardennes, and is used there with great success. In that establishment, the cast-iron ovens of Havrancourt are replaced by 17 cylinders made of strong iron plates, being 0.56 millimetres in diameter by 1.10 millimetres in length, and capable of containing about a quarter of a *stère* of cut wood. These cylinders, furnished with a door placed on the bent part, and turning slowly on their axes, are inclosed in a series of cells made of bricks and cast-iron, and receive from the blast furnaces, by means of holes pierced in the horizontal roof, the heat which issues from the mouth of the furnace in its progress to the *cheminée d'appel*, placed at the opposite extremity. The heat in each cell may be regulated as required. Each cylinder is fixed on a kind of wheel carriage on two small rails, for going in and out of the cells. When the operation is finished, each cylinder deposits its contents beneath the rails. At Phade, the rotation of the cylinder is produced by a horizontal iron bar placed behind the line of ovens; this bar is fastened by an endless screw, and the motion is communicated by a water-wheel.

AMMONIA IN THE ATMOSPHERE.

At a recent lecture delivered by Mr. H. M. Noad at Bristol, the question of the existence of ammonia in the atmosphere and its origin was minutely examined by the lecturer. It was shown, that though ammonia must always be present in the atmosphere in greater or less quantity, its presence never could be detected by the most refined methods of analysis. Supposing the quantity of moisture in 17,000 cubic feet of air at the temperature of 60° to be about 35 cubic feet = $1\frac{1}{2}$ lb., and supposing air at this temperature to allow all the moisture it contains in a gaseous form to fall to the earth as rain, then 1 lb. of water must be obtained from every 11.500 cubic feet of air. Now as ammonia is soluble in water to an almost unlimited extent, it is evident that if any of that alkali be present in the atmosphere, it must be conveyed to the earth with rain; supposing then that 1 lb. of rain deposited from 11.500 cubic feet of air contains 1 grain of ammonia, then the quantity contained in 10 cubic inches of such atmospheric air would contain only 0.000000026 of a grain, a proportion so inconceivably small that were it multiplied 10,000 times it would be inappreciable by the most delicate eudiometer.

Suppose however that a pound of rain-water contains only $\frac{1}{4}$ of a grain of ammonia, then a field of 40,000 square feet must receive annually upwards of 80 lbs. of ammonia, equal to 65 lbs. of nitrogen, which is more than is contained in the form of vegetable albumen and gluten in 2,650 lbs. of wood, 2,800 lbs. of hay, or 200 cwt. of beet root, *the yearly produce of such a surface of ground*; but it is less than the straw, roots, and grain of corn which might grow on the same surface would contain. That ammonia is present in rain-water any person may convince himself by collecting a few pints of recently-fallen rain, and evaporating it carefully nearly to dryness. Having previously added a few drops of muriatic acid, a distinct crystallisation of sal-ammoniac will be obtained, on saturating which with lime the peculiar smell of ammonia will instantly be perceived, and it is worthy of remark that it is accompanied by a distinct smell of animal matter, leaving no doubt as to its origin.

In illustration of this important fact that it is ammonia which furnishes all vegetables without exception with the nitrogen which enters into their composition, Liebig supposes the following case: let us, says he, picture to ourselves the condition of a well-cultivated farm so large as to be independent of assistance from other quarters. On this extent of land there is a certain quantity of nitrogen contained both in the corn and the fruit which it produces, and in the men and animals which feed upon them. Suppose this quantity to be known. The land is cultivated without the importation of any

foreign substance containing nitrogen. Now the products of this farm must be exchanged every year for money and other necessaries of life, for substances therefore which contain no nitrogen. A certain portion is exported with cattle and corn, and this exportation takes place every year without the smallest compensation. Yet after a given number of years the quantity of nitrogen will be found to have increased. Whence, we may ask, comes this increase of nitrogen; it cannot reproduce itself, and the earth cannot yield it; plants, and consequently animals, must therefore derive their nitrogen from the atmosphere.

The remainder of the lecture was occupied in considering the source of this ammonia in the atmosphere, and it was traced to the putrefaction of animal matter. All animal substances during their decomposition yield up the nitrogen they contained in the form of ammonia; this ammonia is diffused through the atmosphere, and being continually precipitated to the earth with rain it is taken up by the roots of plants, where it suffers decomposition, and its nitrogen entering into new combinations is assimilated.—*Bristol Standard.*

THE ADULTERATION OF SUGAR.

(From the Liverpool Mercury.)

As Mr. Accum, in his enumeration of the various articles of diet which were regularly adulterated did not include sugar, we presume that it was then sold to the public in its genuine state, and that the admixture of various ingredients with this necessary of life is a modern improvement of the scientific compounders of the various substances which are vended as pure and uncontaminated. That sugar now, however, is adulterated, there can remain no doubt; and there is as little doubt that the manufacture of the spurious compound is now carried on on a very extensive scale. We understand from a source upon which we can place the most implicit reliance, that a whole cargo of potato fecula gum was lately consigned by a French manufacturer of the article to a London house, for no other purpose but that of admixture with sugar; and it must be a profitable, if not a very honest speculation, as the potato fecula gum may be obtained at about twenty-five shillings per hundred weight.

Our attention was lately directed to this important subject by a correspondent, whose letter we have unluckily mislaid, although we believe we can recollect the substance of this communication. The letter was accompanied by a sample of soft sugar, of good color, not at all calculated to arouse any suspicion as to its quality. Our correspondent had, it seems, made some experiments on various samples of the article, procured from different shops, and on mixing a little of it with cold water he perceived that certain small particles, of a whitish substance, were precipitated, which certainly were not sugar, although our correspondent could not precisely ascertain their nature. We were requested to subject the spurious sample to some decisive chemical test, and with this view we applied to a very ingenious and careful scientific friend, a copy of whose letter we subjoin.

"Sir,—I melted the sample of brown sugar you wished me to examine, in cold rain-water, and submitted it to heat of 70 deg. Réaumur, when I soon perceived a brownish precipitate, which I have no doubt proceeds from the mixture of saccharised potato fecula, obtained by a combination of malt. I inclose you a specimen of this fecula gum, which I have prepared to show upon what ground my assertion is founded. If you dissolve this gum in cold rain water, and then heat it to the abovementioned degree, it will produce at the bottom of the vase the same substance you will find in this sugar; the greatest part, however, of the gum remains in suspension in the liquid, and the percipitate is only the insoluble part of the adulterating substance. By operating upon a larger quantity, say by dissolving one pound of this gum in a gallon of water, and collecting the deposit upon a filter, one could easily ascertain the exact quantity of gum with which the sugar is adulterated. The fecula itself, before being transmuted into gum, does not yield any precipitate,—a pinch of it in the mouth will form a homogeneous soft paste; a pinch of the gum treated in the same way will cause, between the teeth, the sensation of sand in a state of great division in the paste, and it is this powder which is precipitated.

"Should you consider this domestic chemical test of any interest, make of this communication the use you like.—Yours, &c.

"D. F. Albert, L.L.D.
"Manufacturing Chemist.

"Cadishead, April 28, 1841."

THE EXTENSION OF STEAM NAVIGATION.

The vision of Columbus is about to be realised. Arrangements are in progress to connect West Indian steam navigation with a direct and continuous communication across the Pacific Ocean. A regular line of packets is likely to be established within a few months between the western coast of America and New Zealand, which will, doubtless, be quickly extended to the Australian colonies, to India, and to China.

The West Indian Steam Navigation Company have a contract with Government to carry the mails to the West Indies, and their steam ships are in such a state of forwardness, that the first steam packet for the West Indies is expected to leave this country in September. This company, in the best spirit of British enterprise, have expressed their willingness to complete the line between Jamaica and Puerto Bello, on the Atlantic coast of the Isthmus of Panama—a distance of 500 miles, or three days' journey by steam.

There are several routes across the Isthmus; all of which, although indifferent, are even in an unimproved state quite passable. They vary in distance from thirty to about forty miles. That from Puerto Bello to Panama is the best, and is only forty-two miles. By means of a canal, easily constructed from the rivers Chagres, Trinidad, and Gatun, on the Atlantic side, and the Cherroro and Grande, on the Pacific, an easier, more practicable, and expeditious route could be formed at a small cost.

Steam vessels are already established between Panama, which contains 11,000 inhabitants, and Lima, and from thence to Valparaiso. The New Zealand Company have, it appears, resolved to take advantage of this line, and to establish a regular mode of communication between Valparaiso or some other Chilian port and New Zealand. They intend to offer a remunerating charter for a certain number of years to any shipowners who will build four compact fast-sailing brigs, of about 240 tons burden, and engage to keep up a monthly communication in connexion with the Valparaiso and Panama steamers, and thence across the Isthmus with the West Indian and English steamers.

The time to be occupied in the voyage thus made between England and New Zealand, will, it is believed, be seldom more than 80, and may occasionally be reduced to 65 days. The calculation is to Jamaica, 20 days; to Puerto Bello, 3; across the Isthmus, 3; to Valparaiso, 12; to New Zealand, 35; total, 73 days.

It is doubtless to be regretted that the New Zealand Company should not continue the line of communication by steam navigation. The expense of steam, however, is alleged to be greater than a new colony such as New Zealand will bear, and there are, it is asserted, some peculiar winds in crossing the Pacific which render sailing preferable to steam vessels.

At all events an experiment, pregnant with important results, is about to be made. The world will, in a few years, be *belted* by steam; and the British West Indies will become the commercial *entrepots* of the commerce of three quarters of the globe.

While referring to the extension of steam navigation, we may mention one most encouraging fact. Under the old packet system, between Falmouth and Halifax, by the gun brigs, the expense to Government was about £40,000 annually more than the receipts of postage. By the line of Cunard's steam ships, a balance of £20,000 appears already to the credit side of the Atlantic mails.

The indomitable spirit of British enterprise never had a better or more patriotic representative than Mr. Cunard. He not only boldly and simply entered into a contract with the Government, to build four steam-ships of 1,200 tons, and with engines of 300 horse power each, to run across the Atlantic to British North America once a fortnight, but he has more than fulfilled his hazardous engagement. His fine vessels have brought one of our most valuable dependencies within twelve days distance from the mother country, and that with unerring regularity. The punctual success of the Cunard steam ships is owing, in a great measure, to their construction, being far stronger in respect to timber, planks, and fastening, than is usual in ships of equal size. This strength of construction renders the working of the powerful engines perfectly safe in combating the resistance of the most tempestuous weather. Not only are these vessels built much stronger than the usually-required strength, but the engines placed in them exceed the power contracted for; being not 300, but 440-horse power.

The fiscal success of these packets ought, we think, to induce the Government to extend the communication, by enlarging Mr. Cunard's contract, so that he could increase his steam float and despatch a packet from Liverpool to Halifax and Boston once a week during the eight spring, summer, and autumnal months, and once a fortnight during the winter months. By such an arrangement not only would the Post-office gain in revenue, and Mr. Cunard be amply remunerated, but this frequent intercourse would form a rapid line of communication between the whole of Europe and all North America, including every country from the Gulf of Mexico to Lake Superior.

We mention these facts, because in our admiration of the success of the vessels, we are apt to forget the merit due to the contractor and speculator, Mr. Cunard. If he who makes a blade of grass grow where barrenness previously was, is a benefactor to his species, scarcely less grateful ought we to be to him who diminishes distance between two farly separated, but intimately connected countries; and who subdues the tempests and dangers of the ocean for the purposes of facile and speedy intercourse between mankind.—*Journal of Commerce.*

PATENTS.—BRITISH AND FOREIGN.

MONTHLY LIST OF NEW PATENTS.

James Sims, of Redruth, Cornwall, engineer, for *certain improvements in engines.*—6 months, April 29.

Alfred Jeffery, of Prospect-place, New Hampton, Middlesex, gent., for a *new method of defending the sheathing of ships, and of protecting their sides and bottoms.*—6 months, April 29.

George Townshend, of Sapcote-fields, Leicester, Esq., for *improvements in machinery, or apparatus for cutting certain vegetable substances.*—6 months, April 29.

Joseph Gibbs, of Kennington, civil engineer, for *a new combination of materials for making bricks, tiles, pottery, and other useful articles, and a machine or machinery for making the same; and also a new mode or process of burning the same, which machine or machinery, and mode or process of burning, are also applicable to the making and burning of other descriptions of bricks, tiles, and pottery.*—6 months, April 29.

Miles Berry, of Chancery-lane, patent agent, for *certain improvements in machinery or apparatus for making or manufacturing nails and brads.*—6 months, being a communication, May 4.

Francis Joseph Massey, of Chadwell-street, Middleton-square, watch manufacturer, for *improvements in the method of winding up watches and other time-keepers.*—6 months, May 4.

Edward Newton, of Leicester, manufacturer, and Thomas Archbold of the same place, machinist, for *improvements in producing ornamented or tambour work, in the manufacture of gloves.*—6 months, May 4.

Charles Thomas Holcombe, of Bank-side, Borough, merchant, for *certain lubricating or preserving matters for wheels and axles, applicable also to the bearings, journals, and other parts of machinery.*—4 months, May 6.

Hugh Graham, of Bridport-place, Hoxton, artisan, for *an improved manufacture of that kind of carpeting usually denominated Kidderminster carpeting.*—2 months, May 6.

Moses Poole, of Lincoln's-inn-square, for *improvements in the manufacture of fabrics by felting.*—6 months, being a communication, May 6.

Philemon Augustine Morley, of Birmingham, manufacturer, for *certain improvements in the manufacture of sugar moulds, dish covers, and other articles of similar manufacture.*—6 months, May 6.

James Hancock, of Sidney-square, Mile-end, civil engineer, for *certain improvements in the manufacture of locks, keys, latches, and other fastenings, part of which improvements are applicable to taps and cocks for drawing off fluids.*—6 months, May 6.

John Paley, jun., of Preston, Lancaster, manufacturer, for *certain improvements in looms for weaving.*—6 months, May 10.

Hooton Deverill, of Nottingham, lace manufacturer, for *certain improvements in machinery for making and ornamenting lace, commonly called bobbin net lace.*—6 months, May 10.

Andrew M'Nab, of Paisley, North Britain, engineer, for *certain improvements in the manufacture of bricks.*—4 months, May 11.

Edward Tayler, of King William-street, London, gent., for *certain improvements in the construction of carriages used on railroads.*—6 months, being a communication, May 11.

Henry Pinkus, of Maddox-street, St. George, Hanover-square, for *an improved method or methods of applying electrical currents, or electricity, either frictional, atmospheric, voltaic, or electro-magnetic.*—6 months, May 14.

James Gregory, coal master, and William Green, tinner, both of West Bromwich, Stafford, for *certain improvements in the manufacture of iron and steel.*—6 months, May 14.

Pierre Journet, of Dean-street, Soho, engineer, for *improvements in fire escapes, which improvements are applicable to other useful purposes.*—6 months, May 19.

John Carr, jun., of Paddington, engineer, for *improvements in apparatus for retarding and stopping railway carriages.*—6 months, May 20.

Charles Phillips, of Chipping Norton, Oxford, engineer, for *improvements in reaping and cutting vegetable substances as food for cattle.*—6 months, May 20.

Joseph Woods, of Lawn-place, Lambeth, civil engineer, for *certain improvements in locomotive-engines, and also certain improvements in machinery for the production of rotary motion, for obtaining mechanical power; which improvements in machinery are also applicable for raising or impelling fluids.*—6 months, May 22.

William Gall, of Beresford-terrace, Surrey, for *an invention of certain improvements in the construction of inkstands.*—6 months, being a communication, May 22.

John Ainslie, farmer, Redburgh, North Britain, for *a new and improved mode of making or moulding tiles, bricks, retorts, and such like work, from clay and other plastic substances.*—4 months, May 22.

Christopher Dumont, of Mentz, but now of Mark-lane, London, for *improvements in the manufacture of metallic letters, figures, and other devices.*—6 months, being a communication, May 22.

John Winterborn, of Clarence place, Hackney-road, surgeon, for *improvements in machinery to facilitate the removal of persons and property from premises in case of fire, which improvements are applicable to raising and lowering weights generally, to assist servants cleaning windows, and as a substitute for scaffolding.*—6 months, May 22.

William Lewis Rham, of Winkfield, Berks, clerk, for *certain improvements in machinery or apparatus for preparing land, and sowing or depositing grain, seeds, and manure.*—6 months, May 25.

John Whitehouse, of Deptford, Kent, engineer, for *an improved method of making boilers, to be used in marine steam-engines.*—6 months, May 25.

William Joest, of Ludgate-hill, merchant, for *improvements in propelling vessels.*—6 months, being a communication, May 26.

George Hulme, of Saint John-street, West Smithfield, brass and cock-founder, for *improvements in water-closets.*—6 months, May 27.

James Shanks, of Saint Helen's, Lancashire, chemist, for *improvements in the manufacture of carbonate of soda.*—6 months, May 27.

Joseph Bettridge, of Birmingham, wood-turner, for *an improved method of manufacturing papier maché, pearl, china, ivory, horn, wood, and compositions into pillars and stands, for table and other lamps, and other articles of domestic furniture.*—6 months, May 27.

ENGLISH EXPIRED PATENTS.

Thomas Patrick Coggin, of Yorkshire, machine-maker, for *a new or improved machine for dibbling grain of every description*, May 19.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 325.)

James Deacon, of No. 136, St. John-street-road, Middlesex, gent., for *improvements in the manufacture of glass chimneys for lamps*, May 19.—Claim.—The new combination of means, and the new construction of chimneys for lamps, with projecting rings or partitions of glass, having each an opening for the passage of the flame as herein described.

This invention consists in forming a horizontal projecting ring or partition of glass within the chimney, there being a circular opening in the centre of the partition through which the flame passes. It is placed just above the point of combustion, so that the air ascending from below, on reaching it, will be deflected off towards the centre of the chimney, by which means the combustion will be rendered more complete, and the shadow arising from metal deflectors avoided.

John Ashton, of Manchester, Lancaster, hat manufacturer, and John Wakefield, of Salford, Lancaster, hat manufacturer, for *certain improvements in the manufacture of hat bodies*, May 21.—Claim first.—The improvement in the manufacture of hat bodies, of making the same out of pieces of a loom-woven tissue of strips of palmetto palm leaves.

Instead of the ordinary willow bodies, the hat bodies are formed of strips of palmetto palm leaves, woven into a tissue in a loom in the same manner as the strips of willow, but which improved hat bodies will have greater strength and durability than those made of willow, and will not be so liable to be broken by a blow.

Claim second.—The improvement of making hat bodies out of pieces of a compound loom-woven tissue of strips of palmetto palm leaves, woven in combination with threads of cotton or flax.

Instead of the tissue being formed wholly of palmetto palm leaves, it is composed partly of the same, and partly of threads of cotton or flax (both in the warp and in the weft), woven together into a tissue in a loom.

Claim third.—The improvement of making hat bodies, with the round sides or cylindrical parts thereof in one piece of continuous loom-woven compound tissue, or nearly continuous loom-woven compound tissue, of strips of palmetto palm leaves, woven in combination with threads of cotton or flax.

This improvement consists of a continuous tissue, composed of palmetto palm leaves and yarns of cotton or flax combined together, which will form a hat body without a seam.

Two thicknesses of tissue are woven at the same time from the same warp; one thickness being above the other in the loom, and at suitable distances along the length of the tissues, according to the size of the hat intended to be made; the two thicknesses are interwoven together into one thickness, so that on taking the piece of compound tissue out of the loom, and cutting it transversely across at the middle of each junction, it will form a number of pieces of continuous tissue, suitable both in form and size for forming hat bodies. When one of the pieces is put around a hat block, in order to be made up into a hat body, the junctions of the two thicknesses will project outwards, and require to be folded down flat towards the block, and stuck fast, by the application of the "waterproof," and the pressure of the hot iron. The round part of the hat body is thus formed in one piece and without seam.

William Henry Hutchins, of Whitechapel-road, gent., and Joseph Bakewell, of Brixton, Surrey, civil engineer, for *improvements in preventing ships and other vessels from foundering, and also for raising vessels when sunk*, May 21.—Claim first.—The permanent application of inflated waterproof bags, combined with inlet valves and safety valves, in such recesses and parts of ships as will interfere as little as possible with stowage of cargo, consistent with affording a sufficient degree of buoyancy to keep the vessel afloat in case of its being filled with water.

This part of the improvement consists in the application of waterproof bags filled with air, in order to prevent vessels from sinking.

The bags are each provided with an inlet valve, through which they are filled with air, and with an outlet or safety-valve pressed on by a spring, for the emission of the air, so as to prevent the bags from being injured by expansion or super-inflation; they are placed in those parts of the vessel which will interfere the least with the stowage of cargo, such as at the sides, and below each deck, between the beams; but for this no rule can be laid down, as in different vessels and with different kinds of cargo various opportunities of placing them will occur.

Claim second.—The temporary application to a sunken vessel of similar bags in a collapsed state, each bag being combined with an inlet and an outlet or safety-valve, and with a hose communicating with an air-inflating apparatus; such bags being made fast to the various parts of a vessel, or to eyes screwed into the hull, for the purpose of forming attachments to which the bags may be lashed.

A diver descends to the sunken vessel, with the bags in a collapsed state, and attaches them to the beams and other convenient parts by lashing; each bag having a broad selvage, provided with eyelet-holes, through which the cord is passed in order to lash them; but when suitable modes of attachment do not present themselves, the diver screws a number of eyes into the hull of the vessel, and lashes the bags to them; each of the said eyes having a gimlet point, bores its own hole, thereby rendering previous boreing unnecessary.

After the bags are fastened to the vessel, they are filled with air, by means of a hose communicating with an air pump or other suitable apparatus, placed in a boat, or on the shore, provided the place is near enough to the shore.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page* 261.)

JOSHUA SHAW, of Goswell-street-road, Middlesex, artist, for *certain improvements in discharging ordnance, muskets, fowling-pieces, and other fire-arms*, May 17.—Claim first.—The placing a percussion cap on the end of a cylindrical piston or rod, formed for the purpose herein set forth, such piston with its cap being made to pass through an opening adapted thereto, either in the body of the breech of the piece to be discharged, or through tubular pieces screwed into or otherwise attached thereto, the piston being of such length as shall adapt it to the respective modifications of the apparatus; also the improvement in the percussion cap, consisting of the perforation through the middle of what is usually its closed end.

In these improvements the charge of powder is ignited by means of a percussion cap, charged with fulminating powder in the ordinary way; but when used for the discharging of small arms, percussion caps are employed, of a smaller size than those in ordinary use, and for the discharge of cannon, they need not be larger than those now employed with small arms.

A distinguishing feature of this invention is the manner of using these caps, which consists in placing them upon one end of a cylindrical rod of steel or other metal called a piston, and inserting the piston with the cap on its lower end into a cylindrical opening, occupying the place of the ordinary nipple, and made air and water-tight by pieces of leather or cork which embrace the piston.

In small arms, the opening through which the piston passes may be of equal bore throughout, as the piston is in some cases to be of sufficient length to enter the chamber of the barrel, and to extend across it, so that the percussion cap in its lower end will be brought in contact with the interior of the chamber; then if the outer end of the piston be struck by a hammer, the percussion cap will explode and ignite the powder.

In pieces of ordnance, a hole is bored of the size of the piston, in place of the ordinary touch-hole, extending down to within from $\frac{1}{4}$ to $\frac{3}{2}$ an inch of the chamber of the gun, and through this remaining part a hole is bored of about 1-14th of an inch in diameter, until it enters the chamber. The percussion cap made use of under this modification has a small hole 1-16th of an inch in diameter, bored through the centre of its closed end, before charging it with fulminating powder.

When the piston is inserted in the bore, having a percussion cap of the kind just described on its lower end, if its upper end be struck by a mallet hammer, the cap will explode, and the ignited fulminating powder will pass through the hole in the head of the cap, and through the small part of the bore into the chamber of the cannon, and ignite the charge of powder.

This arrangement may likewise be applied to small arms.

Claim second.—The method of placing the detonating powder in a recess formed at the lower end of the piston, on which the slender edge or rim enclosing the fulminating powder is made so thin that on receiving the blow of the cock, it "swedges" upwards, and progressively giving way, as the matter becomes ignited, drives all the fire before it into the chamber of the gun, allowing none of it to escape, by which means any accumulation of dirt or rust about the lock or breech is entirely prevented, insuring quickness and safety, at the same time, the fire being generated within the sixteenth of an inch of the magazine, and upon a level with it; also the nut or priming tube made to receive and secure the priming cap containing the fulminating powder in its proper place, protecting it from the effects of rain or moisture; likewise the priming cap, constructed to operate in the way above stated, and acting in combination with the priming nut or tube.

In this modification the percussion cap is dispensed with, and in place of it a cavity is made in the lower end of the piston 1-20th of an inch in depth, and nearly as large as the diameter of the piston will admit of, leaving only a slender rim to receive and retain the fulminating powder with which it is filled, and which is secured in its place by wax, varnish, or other means. This priming cap is placed in the priming tube or nut hereafter described, resting immediately over the vent of the same; the instant it receives the blow of the cock on its upper extremity, the slender rim retaining the fulminating powder gives way, bulging upwards, so as to be capable of resisting any escape of fire, otherwise than by passing through the vent into the chamber of the gun.

The nut employed to receive the priming cap is constructed with a cylindrical bore, terminating within 1-8th of an inch from its lower end, leaving a flat bottom for the priming cap to rest on, below which a conical perforation is continued, which constitutes the vent leading into the chamber of the gun. This priming tube or nut is screwed into the breech of the gun.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page* 326.)

CHARLES WYE WILLIAMS, of Liverpool, gentleman, for *certain improvements in the construction of furnaces and boilers*, May 17.—Claim first.—The use and application of metallic pins as conductors for transmitting heat.

This part of the invention consists in inserting metal pins in the plates of which boilers, evaporating pans, &c., and pipes, &c., attached to the same, are composed; part of each pin extending through the bottom of the vessel into the liquid to be heated or evaporated, and the other part projecting outside of the vessel into the fire beneath it, by which arrangement a greater quantity of heat is transmitted to the liquid than there would be by the usual method.

Claim second.—The mode of giving the longitudinal and vertical movements to the fire-bars of a furnace; also the extension of the fire-bars outside of the furnace, so as to receive fuel from a hopper, and spread it evenly over the fire-grate.

The fire-bars are serrated (the elevated parts being wedge-shaped, and the depressions quite smooth), and incline downwards from the fire-door towards the bridge of the furnace, their lower ends resting on a bar, on which they are capable of moving vertically up and down as on a centre; the other ends terminate beneath a hopper outside of the fire-place, but within the fire-door; they are supported at this end by eccentrics placed on a horizontal shaft, which being turned by hand, or by gearing from the steam-engine, communicates the up-and-down movements to the fire-bars, and the fuel being received from the hopper on to the outer ends of the fire-bars, is urged with a gradually diminishing force towards their inner ends, and spread evenly over the surface of the fire-grate.

By the continued movements of the fire-bars the generation of clinkers is prevented.

JOSEPH WHITWORTH, of Manchester, engineer, and JOHN SPEAR, of the same place, gentleman, for *certain improvements in machinery, tools, or apparatus for cutting and shaping metals, and other substances*, May 17.—The first part of this invention consists of an improved die for cutting screws. The principle upon which this die is formed may be described as effecting the following object—namely, to cut a screw-thread at any required depth with dies, which have themselves been cut by a master tap, double the depth of the thread, larger in diameter than the shaft on which the thread is to be cut. The improved die is formed from the common die, by dividing the same either into two equal parts (the plane of section being parallel to the sides of the die), or into three unequal parts, in which latter case the two planes of section are parallel with each other, but at an inclination to the sides of the die.

In working this die, its plane of direction instead of passing from the axis of the shaft on which the thread is to be cut to the centre line of the die, as in ordinary dies, passes outside of the said line.

The patentee shows an improved stock, of a very simple construction, to be used with the die.

The second part of this invention is an improved mode of actuating the planing machine, described in the specification of a patent obtained by Mr. Joseph Whitworth, in 1839.

The third part of this invention consists of improvements in slotting machines, the chief feature of which is the compound moving table. This table consists of three parts, the lower part sliding along the bed of the machine; the middle part moving at right angles to the lower one; and the top one having a rotary movement communicated to it.

The fourth part is an improvement in the slotting bar. An angular groove is cut down the back of the bar to receive a strip of metal tapped for small set screws, by which the positions of the cutters are adjusted, and in the front of the bar recesses are scooped out round the cutters, to afford room for the cuttings.

The fifth part is an improvement in the slide lathe, and consists in attaching an apparatus to the headstock or mandril frame of the lathe, for the purpose of forming together with the change-wheels, a more perfect communication between the mandril and guide-screw.

The last part consists of an apparatus for "truing-up" the wheels of carriages and engines on railways.

The apparatus is applied to a pair of wheels in the following manner:—One end of a connecting rod is attached by a stud to the outside bearing of each wheel below the axle, and the other ends of these rods are fastened to a horizontal bar parallel to the axle; on this bar a sliding bar composed of two parts moves, each of its outer ends being provided with a grinder or cutter, placed opposite to and in contact with the outer rim or tire of each wheel; the inner ends of this sliding bar are joined together by an eccentric pin passing through them, fastened on a horizontal wheel, which has its bearings on the under part of the horizontal bar; this wheel is turned by an endless band, from a small pulley on the axle of the running wheels. Motion being communicated to the horizontal wheel, it will by means of the eccentric pin cause the two parts of the sliding bar to move alternately a short space backwards and forwards, by which means the grinders on their outer ends will be caused to traverse from side to side of the tire of the wheels as they revolve, and thereby grind down any inequalities of the same.

ALEXANDER STIVENS, of Manchester, engineer, for *certain improvements in machinery or apparatus to be used as a universal chuck for turning and boring purposes*, May 19.—The patentee claims the peculiar and novel arrangement of apparatus constituting a universal chuck, without confining himself to the number, size, or dimensions of the levers working on the central boss.

The chuck is formed of two plates, viz., a front plate and a back plate, in the former of which are formed three radial mortices; the three holding nogs or dies are attached by screws to dove-tail slide-pieces, which slide backwards and forwards in the mortices. In one of these pieces a nut is formed, in which a screw works, its outer end being supported in a bearing on the edge of the front plate, so that on turning the screw round by means of a key applied to its outer end, the slide-piece will be made to traverse to and fro in its mortice. To each slide-piece is attached one end of a straight lever, the other ends of which levers are attached to an equilateral triangular lever, working loosely on the centre boss of the chuck; by this means, on the screw being turned, the slide-pieces will advance or recede simultaneously within their mortices.

WILLIAM HENSON, of Allen-street, Lambeth, Surrey, engineer, for *improvements in machinery for making or producing certain fabrics with threads or yarns applicable to various useful purposes*, May 19.—This invention consists of improvements in the

ordinary warp machinery for producing looped or knitted fabrics.

The yarns or threads pass from the warp roller (which is mounted in bearings affixed to the upper part of the frame-work of the machine) through a stationary guide or slea affixed to the frame-work, and then through another guide or slea, after which it passes through a series of moveable guides to the needles. The yarns or threads intended to form the selvages of the fabric are carried by spools or bobbins placed at the top of the machine, and when the machine is intended to make narrow pieces of fabric, the bobbins are placed at intervals along the front of the same.

The needles are cast in leads similar to those usually employed in warp frames, and are attached to the needle bar in the ordinary manner, the needles in this instance being placed vertically in the machine. The presser bar at stated periods presses against the beards of the needles, in a similar manner to the operation of presser-bars in ordinary warp machinery.

There are a series of moveable guides placed directly above the needles, through which the yarns or threads pass, and by the movements of which they are lapped around the needles. These guides like the needles are cast in leads, after the ordinary manner of those used in warp frames, and are attached by screws to the guide-bar.

A series of instruments, which the patentee calls hooks or crutches, partly resembling the "sinkers" employed in the ordinary warp frames, and supplying in some respects the place of the same, are cast in leads in the same manner as the guides and needles, and are placed just in front of the needles. The leads of these hooks are attached by screws to a longitudinal vibrating bar, mounted upon rocking levers, a hook being placed opposite every space in the row of needles. The hook bar forms a breast-beam, over which the manufactured fabric passes on its way to the work roller.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 31st of July.

James Smith, of Deanstone Works, Kilmadock, Perth, cotton spinner, due July 19.

Thomas Robinson, Esq., of Wilmiugton-square, due July 19.

Thomas Vaux, of Frederick-street, Gray's-inn-lane, worsted-manufacturer, due July 19.

Caleb Bodells, of Leicester, manufacturer, Christopher Nickells, of York-road, Lambeth, gent., and Archibald Turner, foreman to the said Caleb Bodells, due July 19.

John Barber, of Manchester, engraver, due July 19.

Frederick Steiner, of Hyndburn Cottage, Lancaster, Turkey-red dyer, due July 19.

John Cox, of Georgie Mills, Edinburgh, tanner, due July 19.

Charles Berwick Curtis, Esq., of Acton, due July 19.

Angier March Perkins, of Great Coram-street, engineer, due July 21.

John Melville, Esq., of Upper Harley-street, due July 21.

William Hill Darker, sen., and William Hill Darker, jun., both of Lambeth, engineers, and William Wood, of Wilton, carpet manufacturer, due July 21.

John Bradport Furnival, of Street Ashton, Warwick, farmer, due July 21.

Joham Baggs, of Cheltenham, gent., due July 23.

FOREIGN PATENTS.—BELGIUM.

LIST OF PATENTS RECENTLY GRANTED BY THE BELGIAN GOVERNMENT.

(*Continued from page* 294.)

F. D. Bertrand, a patent of invention for 15 years, for *two machines for manufacturing files economically*, April 5, 1841.

H. R. Fanshawe, jun., of London, represented by Dixon, a patent of invention for 10 years, for *improvements in the manner of paving or covering roads, and other ways or surfaces*, April 7, 1841.

A. F. G. Thomas, of Paris, represented by Persac Lacambre, a patent of invention for 10 years, for *a new machine for felting cloth and other woollen stuffs*, April 7, 1841.

Dierickx de Couchelle, a patent of addition for 15 years, to date from Nov. 30, 1840, for *an addition to the universal economical heating apparatus*, (for which he obtained a patent Nov. 30, 1840), April 7, 1841.

Robert White, represented by Dixon, a patent of importation for 5 years, for *improvements in apparatus for filtering liquids*, April 7, 1841.

Theodore Lemielle, a patent of improvement for 15 years, to date from July 15, 1840, for *new improvements in the miner's lamp*, (for which he obtained patents July 15 and Dec. 30, 1840,) April 10, 1841.

Robert White, represented by Dixon, a patent of addition for 15 years, to date from Feb. 18, 1840, for *new additions to the improved economical stove*, (for which he obtained patents Feb. 18 and Nov. 13, 1840,) April 10, 1841.

Roucloux, Peussant, and Co., represented by Lehardy de Beaulieu, a patent of improvement for 15 years, for *a brick-making machine*, April 10, 1841.

Matthieu Joseph Bertrand, a patent of invention for 5 years, for *a patinet fulling machine*, April 11, 1841.

Jean Nicolas Herman, a patent of invention for 10 years, for *a double, quadruple, and sixtuple barrelled gun and pistol*, April 11, 1841.

Marie Joseph Mazure, a patent of invention for 10 years, for *a new kind of umbrella or parasol cane*, April 11, 1841.

FOREIGN INTELLIGENCE.

FRANCE.

THE IMPORTANCE OF ANTHRACITE TO FRANCE.

The following remarks on the importance to France of the application of anthracite to manufactures are translated from the *Moniteur Industriel*:—

"Among the numerous instances of the progress of industry which have occurred recently in the United States of America, and which ought to excite the attention of France, none is more remarkable than the rapid progress made in the working and general use of a mineral combustible, differing from coal, of which France possesses beds quite equal to those in the United States. We allude to anthracite. The resources of the United States with respect to this kind of fuel are limited to three small basins, situated near each other in Pennsylvania. Anthracite has been found so very convenient for domestic purposes, that it has been substituted for wood in all the great towns on the coast. It is used in manufactures with not less success, for furnaces, and for the generation of steam. It is not yet twenty years since it was first used, and there are already constructed 375 leagues of canals and railroads for conveying the produce of the mines of anthracite from Pennsylvania. In 1839 the anthracite consumed by the United States, independently of coal, amounted to 800,000 tons. It is known that the total production of coal in France is not more than four times this amount; it is about 3,000,000 tons.

"On the borders of Mayenne, at the environs of Sablé, there are rich beds of anthracite, which being used for burning lime intended for manure has caused a revolution in agriculture in the neighbouring departments. In Isère a considerable quantity of anthracite lies at a short distance under the soil, particularly near Nyure, where beds are met with of more than ten metres in extent. The anthracite in the Hautes Alpes is also worked. In the coal basin of Anzin, the beds situated at Furnes and at Vieux Condé, are formed of anthracite. They are beginning to work it at Côte d'Or. Other beds of the fuel, which hitherto have been little explored, appear to exist in other places. In the department of Allier, at a little distance from the mines of Commentry, a bed of anthracite has been met with, which is said to be not less than eight metres in thickness.

"Additional value has been given to the possession of anthracite from the circumstance that a method of applying it to smelting ores has been recently discovered and carried into successful operation in America."

M. Alphonse Karr, the author of *Les Guêpes*, several of which papers formerly appeared in the *Inventors' Advocate*, intends renouncing literature, and to retire to Etretat. It is stated that he has obtained by that publication a hundred thonsand francs, which sum has enabled him to pay off his debts, and to provide a sufficient income for his maintenance.

A waterspout burst over the village of Revermont, on the Rhone, a few days since, and extended its ravages over that and several adjacent communes. A great deal of damage was done, the water washing away gardens on the sides of the valleys, and swelling the streams to torrents. No lives were lost.

The *Journal de Rouen* of the 22d inst. states that the best understanding exists between the numerous English and French workmen employed at the Rouen and Paris Railroad. They have organised a kind of language which is neither English nor French, but by means of which they are enabled to converse with each other.

BELGIUM.

The committee of management of the exhibition of National Industry has during its last sitting, and at the request of numerous manufacturers, definitively postponed the opening of the exhibition to the 1st of August. At the same time it has been determined that the delay of a month should be granted for the conveyance of the articles, which consequently need not be sent to the place of exhibition at Brussels before the 1st of July.

A letter from Maestrecht, of the 19th of this month, says, "The members of the commission for determining the frontiers between Holland and Belgium have been again assembled here for some days past, to continue and conclude their operations. We are assured that the boundary line between Luxemburg and Limburg is entirely settled, and that there remains to determine that between Flanders and Zealand, on which point the negotiations appear to be very far advanced.

At Mazée a lamentable accident occurred a short time since. The father-in-law of the miller of the commune, an old man aged 102 years, named Joachim Misson, having gone to the mill's tail to clear away the rubbish that impeded the current of the water, and being but insecurely perched upon a plank at the water's edge, slipped in. Immediately he was carried by the current amongst the machinery of the mill. The mill being stopped, the miller went to see the cause, and to his great horror found his father-in-law entangled in its

wheels. The poor old man was removed as speedily as possible, but died in a few hours.

M. Deridder, the Belgian engineer, who has been appointed by the Duke of Saxe Coburg to take the engineering department of the railways in his dominions, has met with the most flattering reception. After his arrival, he was invited to dine with the Prince, and in the evening accompanied him to tho theatre.

At the horse-fair at Brussels this year, there were fewer horses for sale and less business done than in previous years. This falling off in the supply and the demand for horses is attributed to the extension of the railway system.

GERMANY.

THE PRUSSIAN CUSTOMS UNION.

The *Augsburg Gazette* contains a long article in which it examines the expediency of concluding a treaty of commerce between Great Britain and the Prussian Customs Union, and asserts that in her negotiations with Germany, Great Britain has pursued the same course which she has constantly followed towards other nations since Cromwell, and which at the present day she dignifies with the name of liberty of commerce, in order to throw dust in the eyes of other nations, as a mountebank addresses the public on stilts to show them a crocodile, whilst he only holds a lizard in his hands. The object of Great Britain is to prevent Germany from becoming a manufacturing country, and to compete with her in foreign markets, for the smallest child in England knows that the prosperity, wealth, and strength of nations depend upon their commerce. The *Gazette* then continues:—"Great Britain wishes to prevent Germany from trading with either of the Indies, or with her possessions beyond the seas, on an enlarged scale. She wishes that Germany should receive the produce of those countries from England, or at least through British ships, for every merchant's clerk in England knows that all European nations who receive colonial produce direct have an opportunity of disposing of their manufactures in return, and that navigation is the basis of the universal preponderance of a nation, and the essential condition of all commerce. This policy will he endangered by the union of the German customs, if Great Britain does not succeed in impeding its development, and in clipping the German manufactures before they have become sufficiently consolidated." The *Gazette* concludes as follows:—"No, it is not the interest of Germany to make concessions to Great Britain; and it would be a most inopportune period to conclude a treaty of commerce with any power until the union is completed hy the accession of all the German states which are situated on the North Sea, and by tho adhesion of Holland and Denmark, which would give them possession of their natural outlets. Then, and only then, should they speak of a treaty of commerce, and then they could speak boldly. To conclude a treaty at present would be to arrest Germany in her career towards improvement and power."

THE FAIR AT LEIPSIC.

The accounts received from Leipsic show that the annual fair just closed has been well attended, but the retail dealings were much more extensive than the wholesale. Buyers from Russia and the Levant were fewer than hitherto, but, in compensation, those from the German Union were more numerous. It is said to have been inundated with English goods, and they were sold at very reduced prices. The greatest business is represented to have been done in Saxon and French silks, the last being particularly sought after. All the stocks of cloths and leathers were taken off at very high prices. This great demand is attributed to the armaments in France and the Germanic Confederation.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

Railway Traffic, &c.—The total receipts from the several railroads in England and Scotland (29 in number) for the last week—that is to say, up to the date to which the returns are calculated, were £71,632; of this there were £13,745 for merchandise, and £57,887 for passengers, parcels, carriages, horses, and mails. The greatest receipts appear to have been taken by the following railways:—London and Birmingham, £16,526; Great Western, £8,165; Grand Junction, £8,603; Liverpool and Manchester, £4,551; Manchester and Leeds, £3,092; North Midland, £3,569; and the Loudon and South Western, £5,500.

Salisbury Railway.—We are enabled to confirm, on the best authority, the rumor that the South Westeru Railway Company have it in contemplation to form a branch line to Salisbury. The point of junctiou will be at Bishopstoke, between Southampton and Winchester. We have since heard that the Great Western Railway Company will probably seek to secure for this line some of the traffic of South Wilts and the adjacent district, by forming a branch from Box, or the neighbourhood, through Warminster and Salisbury.—*Dorset Chronicle.*

The Manchester and Birmingham Railway.—The works on this railway beyond Stockport are progressing rapidly, and there is no doubt that the whole line to Crewe will be ready for public traffic early in the next year. The distance to London by this line will be $12\frac{1}{2}$ miles less than by the Grand Junction.—*Staffordshire Gazette.*

South-Eastern Railway.—On Thursday, the half-yearly general meeting of the proprietors of this company was held at the London Tavern, Bishopsgate-street. From the report it appeared that the works were fast progressing, and that since the last report much land has been purchased, with a view to opening the line from London to Tonbridge by the spring of 1842. On the whole extent of the line four thousand men are in active employment. The tunnels through the Shakspere Cliff at Dover are nearly completed, and the sea-wall at that place, for nearly a mile in length, and fifty feet high, is finished. From the engineers' estimates it appeared that the amount of capital required at present to complete the line from London to Dover will be nearly one million sterling. The total payments of the company up to the 27th instant were £515,617 1s. 3d., and their receipts were £599,987 17s. 9d., leaving a balance of £84,370 16s. 6d in favor of the company. The number of shares on which the instalments (varying from £5 to £26) were in arrear was 8,019, and the amount on them £114,055. A resolution was carried declaring 280 shares, on which the instalments could not be recovered, forfeited to the company; likewise 120 shares which had been sold, and the holders of which refused to come to be registered, were also declared to be forfeited.

RAILWAY ACCIDENTS.

Accident on the Blackwall Railway.—On Tuesday night, shortly after nine o'clock, an accident of a serious nature took place on the line of the Blackwall Railway. A man named Rutherford, aged thirty, a guard in the employ of the company, was standing in front of a carriage of one of the up trains, when, on arriving near the terminus in the Minories, he suddenly slipped off, and fell on the line with his right foot across the near rail, over which the train passed. His foot was very much injured, and it was deemed requisite at once to amputate his great toe.

Accidents on the Works of the Brighton Railway.—On Sunday morning, a laborer employed on the London and Brighton Railway, near Crawley, was knocked down and run over by two brick wagons, and one of his legs was crushed to pieces. He was removed to the Sussex County Hospital at Brighton. The unfortunate man arrived there in almost a lifeless state from the loss of blood, and an amputation of the leg was immediately performed, but he soon afterwards died. Another serious accident occurred on this railway on Friday, when two men named Carter and Blackham were buried by a fall of chalk at St. John's-common. Blackham is a good deal bruised in the back, but he is fast recovering; Carter is not expected to survive.

FOREIGN RAILWAYS.

Extended Railway Communication in Belgium.—Belgium boasts, and with great cause, of her system of railways, which, having beeu commenced and carried on by the Government on one general plan, forms a more complete chain of communication between all parts of the country than can be found in any other kingdom. Still the system is not perfect, and branches are required to make the communication between different towns more direct. With this object works are still in progress, and others are contemplated, of which the *Emancipation* gives the following notice.

"With respect to our great national work of railways, we are desirous of extending the advantages to the greatest possible number of places, to improve the system, and to increase the products; for to us the railroad is the principal agent, not only of industry, but of arts and civilisation, by increasing our connections with foreign nations, by preserving the bonds of peace, by commercial intercourse, and by the extension of general interests. Let us add, that the establishment of railroads in the interior, connecting all the provinces with each other, by promoting daily and hourly intercourse with other towns, will tend to destroy our exclusive prejudices. The continuation of our lines of railway is traced to foreign countries. We communicate with England by way of Ostend and Antwerp, we shall soon reach France iu two directions, and in a little time Luxemburgh will probably be connected with Champagne. By way of St. Trond we shall no doubt reach Maestricht, and by way of Turnhout, Holland and Westphalia. In the interior, Brussels is connected with all the provinces; but all the provinces are not connected with each other. By the line from Ostend to Liége, the provinces of Liége, Limburgh, Antwerp, and the two Flanders, have sufficient connections with each other, as they have with Brabant; the increase of speed compensating for some circuitous routes, the inconvenience of which cannot be compared with the advantages of the new communications. For instance it is by way of Mechlin that passengers are conveyed from St. Trond to Antwerp, and the people of Brussels prefer the journey of sixteen leagues by railroad to the ten leagues of common road which separate it from Ghent.

"But in order to bring the two Flanders in communication with Hainault, Hainault with Namur, and Namur with Liége, branch communications of considerable length would be required. The détour from Bruges to Courtray by way of Ghent (leaving the province to enter to it again), is almost so great as to induce a preference of the old paved road. Branches are spoken of which will unite, or at least shorten, the roads between Boulers, Enghien, Thielt, Thourout, &c., with Courtray and Bruges.

"Thus from Ghent and Bruges the railroad would enter Hainault hy way of Courtray and Tournay, but the line would have to be continued from Tournay to Mons; from Mons the railroad is in progress towards Braine-le-Comte, Charleroy, and Namur. The extension towards Liege has still to be made. We believe that some day the proposed branch from Namur to Tirlemont will be completed. The contract for this branch has been solicited by a private company on the most advantageous terms for the state. This would be a circuitous route, it is true, but though Liége would be a little more distant from Namur, the whole of Limburgh and consequently Westphalia would be brought into more immediate connection.

"The works on the railway from Portel to Turn-

hout are advancing rapidly; in a few weeks the line will be entirely finished. The paved road from Ghent to Turnhout is also advancing; it will reach the town in the course of the month."

Effects of Reduced Fares on the Belgian Railroads.—Some of the Belgian papers have opposed reduction of fares which has lately been made in the the third class carriages of the railways, on the ground that the fares previously charged were as low as could be remunerative. The *Emancipation* publishes a statement of the number of passengers conveyed during the first ten days of May last year, when the higher fares were charged, and the first ten days of the present year, for the purpose of showing, that though there has been an increase in the number of passengers, the receipts have diminished. Similar results have attended the raising of the fares on several of the lines in England, which proves that the interest of the companies and the interest of the public are not identical, and that if railways are to be conducted on principles beneficial to the public, they must not be left altogether to the control of the directors.

"The following is a comparison of the result from the 1st to the 10th of May 1841, (tariff of the 10th of April 1841), with that from the 1st to the 10th of May 1840 (tariff of the 3d of February 1839):—

"The number of passengers during the first ten days of May 1840 was (comprising ten military convoys) 66,332.

"The number of passengers during the first ten days of May 1841 was (comprising 12 military convoys) 75,672.

"During the latter period there has been then an increase of 9,340. With respect to these 9,340 passengers, it must be observed, that about five thousand ought to be deducted; for included in this number are those who took their places for Tirlemont, or from Tirlemont to the other localities, during the three days the fêtes lasted. But what most challenges attention, is the diminution of the number of the passengers in the higher class carriages, and the decrease of receipts.

"In May 1840, the number of passengers by diligences (first class carriages) was upwards of 7,023; in May 1841 it was only 5,063, being a difference of nearly 2,000. The receipts for the diligences during the ten first days of May 1840 were 30,019 frs.; in 1841, they were only 21,341 frs. The diminution consequently was 8,677 frs.

"The number of passengers by chars-à-bancs (second class carriages) was in 1840 about 19,642; in 1841 it was 20,247; notwithstanding this trifling increase, the receipts for this class of carriages, which in 1840 were 42,442 frs., have fallen to 40,534 frs. 70 c. which is a diminution of 1,907 frs. The number of passengers in wagons (third class) is increased, but the 39,667 passengers comprise the military, who had been conveyed by wagons in 1840, when the receipts were 50,674 frs., and the 50,362 passengers of 1841 produced only 44,171 frs. 25 c., which is a reduction of the receipts of the wagons of 6,502 frs. Thus the number of passengers in 1841 increased during the operation of the new tariff, for a period of ten days, as compared with the year 1840, about 9,000 passengers (it must not be forgotten that nearly 5,000 were to be attributed to occasional causes), and the receipts during this time were diminished about 17,088 frs.

The Paris and Rouen Railroad Company are now accomplishing the legal formalities requisite for their commencing operations in the department of the Eure.

The *Alsace* states that in the night of the 12th inst., some malignant person forced up one of the rails of that section of the Mulhausen and Saint Louis road which runs between Sierentz and Ham-[illegible], and threw it down to the bottom of the embankment. Fortunately a watchman discovered the displacement early in the morning, and restored it with sufficient solidity before the first train came up, or the consequences might have been deplorable. The perpetrator of this wicked act is not known.

Articles Left in Railway Carriages.—The *Moniteur Belge* publishes an inventory of the articles found on the railway from the 1st September 1840 to the 30th of April 1841, and which then remained unclaimed. Among these are 49 umbrellas, 44 men's hats, 99 caps, 142 pocket handkerchiefs, 12 ridicules or ladies' bags, 8 pairs of spectacles, a steel folding knife with a silver gilt handle, a cheque for 500 frs., and a great quantity of other articles.

The *Hanover Gazette* announces the opening of a great part of the railroad from Berlin to Dresden, by which the distance may be traversed in 12 hours.

Railroads in Germany.—The Duke of Brunswick has set out from his capital for Berlin, to consult, it is believed, with the Prussian Government, about the establishment of railroads, and principally that of Magdeburg, as well as on the accession of the Duchy to the German Customs Union. We learn from Vienna that a new section, eight miles in length, of the Emperor Ferdinand's railroad, has been opened with the usual ceremonies. It runs from Lunenburg, in Moravia, to Hradisch, in the same province. It is expected that twelve miles more will be opened before the winter, and that in two years the whole of the road, extending to 35 miles, will be finished.

THE LAW OF DEODANDS.

In the Court of Queen's Bench on Monday the Court gave judgment in the case of the Queen *v.* Polworth, which will have the effect of deciding the cases of the deodands awarded by the coroner's jury at the Harrow inquest, and on all similar cases where the accident is attributed to the misconduct of any person.

A person called Joseph Mason having met his death in consequence of the improper manner in which a steam-boat had been managed, the coroner's inquisition found a verdict of murder against a particular individual, and levied a deodand of £800 upon the steam-boat. A certiorari was obtained to bring up the inquisition, and a rule to show cause why it should not be quashed was subsequently argued before the Court.

Lord Denman stated the opinion of the Court to be that a coroner's jury had no power to impose a deodand in an inquisition where they had also found a verdict of murder. All the cases of deodand reported on the books were cases in which the death had occurred by misadventure; and, whatever might have been the origin of deodands, it had never been thought that they were intended to operate as fines to be imposed upon individuals for negligent or malicious conduct. The principle upon which they were founded was now a matter of mere conjecture; but, whatever it might have been, the Court was of opinion that at this time of day they were not called upon to extend the application of them beyond those instances in which they had been levied according to ancient usage, and the established principles of the common law. The finding of a deodand on the same inquisition which returned a verdict of murder had been presented for the first time in the case now under consideration, and the Court had therefore no difficulty in deciding that such part of the inquisition as related to the imposition of the deodand should be quashed.

THE GLASGOW TUNNEL.

(From the Glasgow Herald.)

We had an opportunity a few days ago of passing throughout the great tunnel situated at the Glasgow end of the Edinburgh and Glasgow Railway, immediately adjoining Queen street, and we can safely say that it is one of the most stupendous works of the kind we have ever witnessed. Although a free current of air now passes from end to end of the tunnel, it is not to be supposed that it is yet opened upon the level. At some points, it is true, it is opened to the full extent of 26 feet in breadth by 22 in height, but at others the opening is so narrow that we were required to creep almost on our hands and knees over the jagged surface of recently blasted rock, along which the water was oozing in large drops, and with the darkness of midnight, excepting so far as relieved by a miner's lamp,—the scene was sufficiently awe-striking and horrible. The men are working in numerous parties upon various flats; some have excavated and blasted almost to the level upon which the rails will be laid, while others are working as it were upon a story or elevation right above the heads of the others, and daily making larger apertures, which as yet will do little more than admit the body of a man. In coming upon a gang of workmen, they are first discerned by the flickering of their tiny lamps, which in the distance resemble vivid stars forcing their light through the gloom of a December sky. Ever and anon the ear is saluted by the loud report and crash of the gunpowder rending asunder the solid rock; the vapor from the explosion is felt with sickening effect, and altogether it requires no slight exercise of nerve to endure an imprisonment in such a place, for however short a time.

The length of the Glasgow contract, which includes the tunnel, is 2,200 lineal yards. The tunnel extends to 1,250 lineal yards, divided by two eyes of 40 feet each in length, by from 70 to 80 feet in depth; and this leaves 950 lineal yards of open cutting. The tunnel is carried through a variety of strata, consisting of free-stone, lime-stone, fire-clay, fakes, and black-blaze. When completed there will have been removed from the tunnel 144,383 cubic yards of material, and 135,289 cubic yards from the open cutting, consisting of rock, blaze, clay, &c. The stuff excavated from the tunnel is lifted from eight shafts, exclusive of the two ends, by six steam-engines, and two horse-gins. On an average there are employed on the contract above 100 masons, 50 quarrymen, 16 wrights and blacksmiths, 350 miners, &c., with 20 horses and carts. The men employed within the tunnel work in three shifts of eight hours each, making up the day of 24 hours; and as it is not every one who is competent to work within the tunnel, even though they may be good ordinary out-of-door workmen, the wages are proportionably high, running according to ability from 21s. to 24s. per week, for the shift of eight hours each day. The men are only allowed 15 minutes in each shift for refreshment or relaxation, and thus the work while it lasts is particularly severe. We believe this will be the last contract in its completion throughout the entire line; but no blame attaches on this account to Mr. Marshall, the contractor, who has driven the work forward in a most satisfactory and spirited manner. He only commenced in June, 1839, but a considerable portion of the plan was not placed in his hands till May last year, from the delay in effecting a settlement with the respective proprietors along the line. Even with all these difficulties, Mr. Marshall expresses his confident opinion, that, should no unforeseen obstruction arise, he will finish during the month of August next, and indeed, he has not the slightest fear of any delay beyond that period. In some portions of the tunnel the arch is thrown over by solid blocks of white freestone, and in others it is of brick, but in both the workmanship appears to be of a first-rate description; and as from its close proximity to Glasgow it will be quite easy to light it up with gas, should the directors so resolve, the tunnelled pathway into the city will not only be a handsome one, but divested of all the gloom which many timid people complain of in their passage through long tunnels.

We observe, too, that the buildings connected with the public offices for the Edinburgh and Glasgow Railway, at the station in North Queen-street,

are advancing rapidly to completion, and the same may be said of the erections to the right and left of the entrance to the tunnel. When completed, this entrance will be a very imposing piece of architecture indeed. The arch at this place will be 60 feet in width, surmounted with an ornamented parapet, and forming the south boundary of Bath-street. At Cowlairs station, where the fixed engines, workshops, &c. are to be situated, the work gets rapidly on; and the contractors on all these works appear to be using every exertion for keeping faith with the public in reference to time.

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of to-day.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 24 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes, containing the Nos. of every 6 months.

THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, MAY 29, 1841.

The Copyright of Designs Bill seems likely to be as little successful as the bill for the protection of literary copyright. Last Wednesday was fixed for proceeding with the bill, that being the only night which Mr. Emerson Tennent could obtain for its consideration; but the Derby day afforded little hope of a muster of members sufficient to form a "House." The bill has consequently been put off till after Whitsuntide, with no day mentioned for its reconsideration. It is thus that the most important measures relating to improvements in the manufactures of the country are neglected, whilst party questions engross the attention of the representatives of the people.

Since our former remarks on the importance of this measure, and on the futility and inconsistency of the objections urged against it, we have seen Mr. E. Tennent's treatise on the "Copyright of Designs," in which the subject is considered in all its bearings. The arguments in favor of an extension of the copyright are stated clearly and with great force, and the possible objections advanced by its opponents are answered. Mr. Tennent, as chairman of the committee on the copyright of designs, had ample opportunity of sifting the evidence, and of eliciting from the witnesses facts calculated to elucidate the subject. Of this he appears to have availed himself to the full extent. He is a strenuous advocate for the extension of copyright, on the ground rather of national advantage than individual right, and in the manner in which he states the case he seems not to leave the shadow of a reason to the objectors, even on their own mode of viewing the question, which is exclusively confined to the general effects on the cheapness of production, without any regard to the rights of the original inventor.

Mr. Tennent sets out by describing the state of the law regarding copyright of designs in foreign countries, and the effects of protection on the manufactures where the copyright is best protected and most extended. The example of France is most instructive.

"The French, in every department of art, as applied to manufactures," observes Mr. Tennent, "stand pre-eminently at the head of all the nations of the world. In France the law of copyright, for the protection of designs, is the most comprehensive and effectual in Europe, giving the artist an exclusive property in the profits of his own inventions for three, five, or fifteen years, and even, if he desired it, for life. If the latter circumstance be not the cause of the former; if the fostering influence of the copyright be not the foundation of their superiority in all the walks of taste, it at least proves this, that the most liberal legislation on the subject, is perfectly compatible with the highest excellence in the manufacture, and the utmost prosperity in the trade."

In thus stating the case Mr. Tennent takes the lowest ground, for there can be no reasonable doubt on the mind of any one who peruses the evidence of the witnesses examined before the committee, that the great and admitted superiority of the French patterns is to be chiefly attributed to the protection afforded to their designs. It was clearly proved, and it might have been inferred from the state of the law in England, that our manufacturers refuse to employ first-rate artists to design their patterns, because the insufficient protection does not afford them a chance of remunerative returns for the expense which the more elegant designs would entail. They are thus compelled, by law, to produce inferior goods, which cannot compete with the French, even in our own markets, and to attend merely to the cheapness with which such common articles can be manufactured.

By the very inefficient protection which a three months' copyright, always exposed to infringement, affords, the English calico-printer is placed in a position analogous to that of the occupiers of land in a lawless country. The fear of being dispossessed of his occupation, or deprived of his crops if the ground be cultivated, restrains the tenant from exertion or expense, and the land is either allowed to go to waste, or to produce such crops only as can be no object of envy to the freebooter. Confidence in the undisturbed possession of any created wealth is an essential element to its production, and where this is wanting the perfection of any art or manufacture requiring labor and expense cannot be expected.

The Court of Queen's Bench has this week pronounced a judgment, which will have the effect of setting aside the deodands awarded by the coroner's juries at the investigations into the fatal railway accidents at the commencement of the present year. The principal objection taken to those verdicts was, that deodands can only be levied in cases of *accident*, and that it is incompatible with the law to criminate any one as the cause of death and to levy a deodand on the thing by which the fatality was occasioned. The Court of Queen's Bench has decided that this objection is valid, and that a verdict levying a deodand under such circumstances must be quashed. The case immediately at issue, and which must guide the decision in the railway cases, had reference to the death of a person run down by a steam-boat. The jury found the party navigating the boat guilty of manslaughter, and at the same time levied a deodand on the steam-boat of £600. It appears that the law authorities afford no precedent for levying a deodand, except in cases where death happened by "misadventure;" and the Court being bound to act by precedent decided accordingly.

We stated our opinion, when commenting on the Harrow inquest, that the principle on which the levying of deodands depends would be equally applicable in cases of felony as in cases of acci-

dents; and Lord Denman himself avowed that the judgment of the Court to the contrary had no foundation in reason, but rested solely on precedent. The absurd effect of this decision will be, to indemnify railway companies and others, in cases where culpable neglect can be proved, and to mulct them only when disasters arise for which no one can be blamed. The levying of deodands is one of those numerous relics of former ages with which the law abounds, hallowed, indeed, by time, but altogether unfitted for existing circumstances. The practice has hitherto been wrested from its original purpose, and made to operate, though very ineffectively, as a punishment for carelessness and misconduct on the part of the owners of the article which was the passive agent of the calamity; but the decision that has now been pronounced will remove this indirect check on carelessness, and will necessitate the immediate passing of some law to extend the liability of all public carriers, whether by land or by water. The law in Scotland, which gives the surviving relatives a claim for compensation, is founded on rational and equitable principles, and we should be glad to see its provisions extended to this country. At present the law makes it the interest of railway companies, that in cases of accident the passengers should be killed rather than wounded; for when death ensues they are not answerable, but if the injuries be not fatal they may be forced to make compensation.

NEW INVENTIONS.

NEW SIGNAL FOR SHIPS.

A method has been contrived for giving signals, by means of which ships meeting at night may ascertain the course which each is steering, so as to enable them to avoid collision. The plan is the contrivance of Mr. Bain, whose other inventions we have recently noticed, and it seems well adapted, by its simplicity, and the easy mode of its application, to effect the desired object. The signal light is to be placed inside a kind of lantern, the glass of which is to be formed of three colors, green, red, and yellow, and to be moveable up and down. A small rope, which is affixed to the helm, is carried to the mast on which the lantern is elevated, and passes over a pulley above it, so that as the helmsman turns the wheel the frame of colored glass will be raised or lowered. The effect of this arrangement is, that a differently colored light is shown according as the helm is put to starboard or larboard. For example; if the rudder be put to the starboard quarter, the red colored glass will be raised opposite the flame, and show a red light; if to the larboard, the glass will be lowered, and a green light will be exhibited. If the rudder be placed midway, the yellow light will be shown; and on the intermediate points a portion of red and yellow, or green and yellow, in which either color will predominate, according as the rudder is placed more or less to larboard or starboard. It is evident that if two ships were to meet at sea on a dark night, provided with these course-indicating signals, they would be able to ascertain the direction in which each was steering, with sufficient accuracy to prevent the chance of collision. Most of the fatal accidents that have recently occurred at sea from one ship running down another would have been avoided had the helmsmen known the course of the respective ships. There seems to be little or no difficulty in adopting such a signal as we have described, the advantage of which appears to be indubitable.

MARBLE CEMENT.

A preparation of plaster has been recently invented by Mr. Keene which possesses most of the requisites of the finest marble, and in hardness far exceeds any kind of plaster that has hitherto been in use. We have seen specimens of this composition which seem nearly equal to marble, as it bears a high polish, and is but little more absorbent of moisture. It will bear a smart blow of a hammer without breaking. As the composition may be moulded into any form, and subsequently polished, it seems well adapted for ornamental chimney pieces, and for purposes in which marble is inlaid with cabinet-maker's work. The rapidity with which this cement dries renders it peculiarly applicable for stuccoing, when despatch and firmness of texture are wanted—and its appearance is far superior to ordinary stuccoes.

HYDRAULIC CEMENTS AND FACTITIOUS STONE.

M. Kulhmann of Lille, a distinguished chemist, has made a discovery which promises to be of great importance in building, and for other purposes. At a late meeting of the French Academy of Sciences, the nature and results of his researches were stated. In many communications previously made by him to the Academy he has considered the efflorescences on walls, their nature, origin, and the circumstances which cause their formation; by which the presence of salts of soda or potass is shown in the greater part of the limestones of all geological formations. He has made experiments on different cements, and they all presented decided signs of the presence of potass. It was by following up these observations that M. Kuhlmann was led to undertake a new series of researches, the remarkable results of which he communicated to the Academy. In the first place, he directed his attention to artificial hydraulic limestones made in the dry as well as in the humid way. In both methods of operating he succeeded in producing very economical hydraulic mortars, by adding to lime or chalk sulphate of alumine or alum. It thus constitutes an aluminate of lime. M. Kuhlmann has found that on placing chalk in contact with a solution of alkaline silicates, even when cold, a certain exchange of acids ensues between the two salts, and that a part of the chalk is transformed into silicate of lime, a proportional amount of potass passing into the state of carbonate of potass. If the chalk in powder has been thus partially transformed into silicate of lime the paste which results from this transformation hardens by degrees on exposure to the air, and becomes as hard, or even harder, than the best hydraulic cements; it is, in fact, an artificial stone, which, when it has been prepared in a paste sufficiently liquid, and with a sufficient quantity of silica, has the property of strongly adhering to the bodies to the surfaces of which it is applied. Thus the silicate of potass or soda might serve to prepare mastics analogous to cements, without its being necessary to calcine the chalk. These mortars appear to be applicable in certain circumstances to the restoration of public monuments, to the formation of casts, &c.

Of all the results obtained by M. Kuhlmann, the following appear to be the most interesting. When, instead of presenting the powder to the solution of alkaline silicate, it is presented in a paste, of sufficient consistence, an absorption of silica also takes place, and in quantities that may be varied at pleasure. The masses of chalk increase in weight, become shining, of a rough grain, and the color is more or less yellow, according as they are ferruginous. The immersions may be either cold or hot, and a few days of exposure suffice to transform the chalk into siliceous limestone so hard as to scratch some marbles; the hardness gradually increasing by exposure to the air. Even from three to four per cent. of absorbed silica gives a great hardness to the chalk.

The stones thus prepared are susceptible of a beautiful polish. Their hardness, which is at first superficial, penetrates by degrees to the centre, even when the mass is a thick block. On account of their hardness, and their fine and uniform grain, the chalks thus prepared appear capable of becoming of great use in works of sculpture, and in different ornaments even of delicate workmanship; for when the *silicazation* takes place in chalk that is very dry, which is requisite to obtain the best effects, the surfaces are never altered by the weather.

M. Kuhlmann has made attempts to apply these stones for the purposes of lithography, and the first results of his experiments promise complete success.

This method of transforming soft limestones into siliceous limestones may be applied most advantageously in building. Ornaments which would be unchanged by the rain, and of great hardness, might be obtained at low prices, and in many cases a plaster made with a solution of silicate of potass might serve to preserve from further decay ancient monuments composed of mortar or of soft limestones. The same plaster might become of general use in countries where chalk forms almost the only building material.

The inventor has extended his process to carbonates of barytes, strontian, magnesia, lead, &c., in which the same re-actions take place, and he obtained analogous results.

Plaster has also been an object of M. Kuhlmann's researches. The decomposition of plaster in silica is still more rapid and more complete than that of chalk. Plaster cast in a mould, and immersed in a solution of silicate of potass, becomes very hard, and has a very remarkable shining appearance; but if the transformation is too rapid, this is only superficial, and after exposure to the air for some days, the surface peels off with the least touch. In order, therefore, to *silicitize* plaster, it is requisite to operate with very feeble solutions; and it is also very important to render the plaster more porous by the introduction into it of foreign matters, such as chalk, fine sand, &c. The siliceous liquid may then enter into the paste itself, to complete the silicization afterwards by immersion. M. Kuhlmann, in reference to the formation of natural calcareous silicites, enters into some considerations to show that Nature appears to have had recourse to transformations analogous to those now pointed out as the means of producing factitious stone. His researches tend to prove that the silicate of lime which accompanies chalk has no other origin than that resulting from the filtration of the silicate of potass or soda in a state of solution in water.—*Moniteur Industriel.*

ENGRAVING IN RELIEF BY VOLTAIC ELECTRICITY.

Mr. G. H. Hoffman, of Margate, proposes certain modifications of the processes at present in use, the result of which he conceives will be found greatly superior. A flat copper-plate, such as is used by engravers, is to be covered with thick soft etching-ground; in this lines are to be scratched or cut, or dots stippled with a blunt or sharp point down to the copper, as in common etching; the plate is then to be immersed, and the copper deposited in the usual manner, and the electric action to be continued until the deposit forms one solid sheet. The compound plate is then to be heated over a spirit lamp, so that the etching ground may be melted and run out. The plates are then to be separated; and, after carefully washing with hot oil of turpentine, the engraving will appear, polished, sharp and perfect.

PATENT HERCULEAN METALLIC ROPE.

At the recent meeting for the collection of facts in science, held at the Philosophical Institution, Birmingham, Mr. Spilsbury Butler read a paper giving the following description of his patent metallic rope.—A rope of one inch diameter is capable of carrying three tons or more. The interior is formed of hemp, covered with iron wire of 28 gauge, shaped in plats, containing twelve wires in each

plat, and twelve plats in the circumference. Each wire will bear, when suspended in a yard's length, eleven pounds four ounces; consequently, if the wires were placed in parallel lines, each strand of twelve would bear a tension of one hundred and thirty-five pounds; or, the hundred and forty-four wires which form the circumference would bear sixteen hundred and twenty-six pounds. This is of course what the wire alone, being placed in parallel lines, will bear; but when the wires are placed diagonally it is obvious that the bearing or weight must be very materially checked. The wires being transversed, and supported by counter or transversal wires, causes a portion of the bearing to be thrown off the section by the acute angles acting as a bearing or arch foundation to the centre of the unitive section. In traversing a section before it comes again into the perpendicular, it will be perceived that there are underneath the first section twelve independent bearings (or arches) to support the weight before it again receives the pressure. Each section, therefore, being composed of separate wires, acts as a bearing to the others, and being formed in plats cylindrical increases the strength and tends to its pliability. The interior body being composed of hemp well wrought, acts as an internal bearing to each section, consequently when the rope is bent it supports both the under or contracted section and the upper or elongated section, and enables them to return to their former position without their having sustained the slightest injury. This rope being formed upon the simple principle of "unity" being "strength," puts its utility beyond a doubt where great weights are to be suspended and pliability is required.—*Midland Counties Herald.*

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING MAY 31, 1841.

Tuesday	Linnæan Society	8	P.M.
	Horticultural Society	3	P.M.
	Architectural Society	8	P.M.
Wednesday	Society of Arts	7½	P.M.
	Geological Society	8½	P.M.
Thursday	Zoological Society	9	P.M.
Friday	Botanical Society	8	P.M.
	Royal Institution	8½	P.M.
Saturday	Asiatic Society	2	P.M.
	Mathematical Society	8	P.M.

ROYAL INSTITUTION.

May 21. Friday Evening Meeting.

Mr. J. F. Daniell delivered a lecture "On the Spontaneous Evolution of Sulphuretted Hydrogen in the Waters of the Western Coast of Africa, and elsewhere." At the request of the Lords Commissioners of the Admiralty, in April 1840, Mr. Daniell was requested to analyse and report upon samples of water obtained from eight different localities on the Western Coast of Africa, with a view, if possible, to account for the rapid decay of the copper sheathing of ships on those stations, in order that some contrivance might be applied to the vessels which have sailed for the Niger Expedition. He was informed by a large refiner of copper in South Wales, that vessels cruising on the coast of Africa have their copper destroyed in the space of nine months, which it would take three or four years to effect in other situations. A plate of copper was shown taken from a ship which had been in those parts; one side was covered with the ordinary green-colored rust (subchloride of copper), and the other was of a black hue; it was also unevenly eaten into holes. This specimen was contrasted with a piece of the copper sheathing from the Royal George, as furnished by Col. Pasley, and which had been subjected to the action of sea water for 60 years; it was not at all impaired. This circumstance proves that in the former instance something was present in the water of the African shores, which did not exist in other situations. On uncorking the sample bottles he was struck with the strong smell of sulphuretted hydrogen gas; and in the sample from Sierra Leone, taken three miles from the mouth of the river, he found, on analysis, that it contained six cubic inches and eighteen hundredths of this noxious gas in a gallon of water, and 1,698 grains of saline matter in the same quantity. At first he was inclined to believe that the gas was generated by the decomposition of some extraneous animal or vegetable matter after it was bottled; but this was not the case, as the sediment, on examination, did not amount to one half of a grain in that quantity. The fetid smell was dissipated after exposure for a few hours to the air. The characters and properties of sulphuretted hydrogen were then enumerated. It is generally met with in the water of Harrowgate, which contains 18½ cubic inches; while that of Aix la Chapelle contains 44 cubic inches in a gallon. All the waters that were examined were free from any deposit, and the following were the data given deduced from his experiments. The water from—

	Cubic inches of this gas.	Grs. of saline contents in the gallon.
Volta contains	6.99	2,480·0
Bonny	1.21	1,788·0
Mooney	None	2,104·0
Gobon	None	2,160·0
Lopez bay	11.69	2,576·0
Congo, taken 35 mils from its mouth	0.67	188·0
Bango	4.35	2,736·0
Lagos	14.75	1,920·0
Grand Bonny	28.00	1,664·0

The saline contents are much the same as those met with in all waters, the proportions being very nearly alike. The water impregnated with the sulphuretted hydrogen appears to extend over 15 or 16 degrees of latitude. Professor Marcet has detailed, in the Philosophical Transactions for 1839, the analyses of 16 specimens of sea water, one of which, brought to this country by Captain Basil Hall, was as highly charged with this gas as the waters which Mr. Daniell had examined. Another instance of the fact was placed on record by Mr. Garden, as in the two last examples in the above table, viz., Lagos and Grand Bonny; the water was collected by Sir Wm. Burnett, and the account was published in March, 1839; fully confirming the experiments of Mr. Daniell. But although this fact has been known for some time, it remained for Mr. D. to point out the cause of the destruction of the copper sheathing of ships. He arrived at this conclusion by examining the black powder found on the copper when removed, which proved on analysis to be the *sulphuret* of that metal. He considered the knowledge of this circumstance was of the greatest importance to the manufacturer, as some instances recently occurred in which an action was brought against some copper smelters, for sheathing vessels with copper of bad quality, as instanced by its non-durability and liability to corrode; and on the evidence given by scientific witnesses a verdict for the plaintiff in both cases was pronounced. The remedy Mr. D. proposes is to have *protectors* formed of zinc, as this metal, when in contact with copper, prevents sulphuretted hydrogen gas acting on it; and he recommends that they should be so constructed as to be applied when necessary, and not kept always in contact.

Mr. Daniell considers that the sulphuretted hydrogen gas arises from the action and the re-action of vegetable matter brought down in great quantities to the mouths of rivers, and which, acting upon the *sulphates* contained in the sea water, produces decomposition, and the evolution of the gas. In order to illustrate this fact, he procured three jars, into each of which he placed dead leaves, on one was poured distilled water; on the second, water containing common salt in solution, and on the third, water containing sulphate of soda dissolved in it. After they had remained in contact for the space of three months, he examined them for sulphuretted hydrogen, and found little or none generated in the two first, but abundance in the third. Since the report was made to the Admiralty the lecturer has read an account in the *Annales de Chimie*, in which it is likewise suggested that the sulphuretted hydrogen is generated in nature from the decomposition of the sulphates. He thought it very probable that the existence of this deleterious gas in the atmosphere is the cause of miasm in the regions where epidemics abound, and he brought forward numerous examples to prove that in Europe and other places malaria appears to be confined to marshy situations in connection with the sea, and instanced the fact that the mouths of large rivers are known to be generally more unwholesome than those parts more remote from the sea, especially if the land be low and marshy; and that on the Essex coast it might be worth while, for the sake of the health of the populace, to prevent if possible, the ingress of salt water to the marshes, and in this way alone to get rid of the effluvium and miasm arising from the action and re-action of sea water on vegetable matter.

LINNÆAN SOCIETY.

May 21. Anniversary Meeting.—The Bishop of Norwich, President, in the Chair.

The report of the council, and that of the auditors, having been read, the society proceeded to elect the officers for the ensuing year, to fill the vacancies afforded by the five retiring members of the council. The following gentlemen were elected: Sir W. J. Hooker, Mr. James Janson, the Marquis of Northampton, Mr. John Parkinson, and Mr. J. O. Westwood. In the address delivered by the President, allusion was made to the great loss the society had sustained by the death of Francis Bauer, Esq., Sir Anthony Carlisle, N. A. Vigors, Esq., M.P., &c. &c.

BOTANICAL SOCIETY OF LONDON.

May 21. John Reynolds, Esq., Treasurer, in the Chair.

The Secretary announced a collection of about 8,000 North American plants, from Dr. Gavin Watson, of Philadelphia, U. S.

Mr. Sansom exhibited specimens of *Leucojum Æstivum* and *Althæa Hirsuta*, from the old habitats in Kent. A collection of mosses from Mr. Dickie, of Aberdeen, together with a series of fruits and seeds from India, were presented by Mr. Davison. A translation of a paper was then read, being "An Essay on the General Disposition of Recti-serial Leaves," by Messrs. L. and A. Bravais. Whatever may be the extent of modern works on botany, the organisation of the superior order of plants presents an inexhaustible fund of matter for research. The order which is met with in the position of leaves and leaf-buds in stems has always attracted the attention of the most profound observers. Many have conceived that the symmetry of plants is in conformity with a regular geometrical construction; but the multiplicity and caprice of vegetable forms render the application of this principle extremely difficult, and have baffled the most brilliant theories. From special researches the Messrs. Bravais have come to the conclusion that the greater part of alternate leaves are not arranged in whorls, but remain solitary in the plan of their insertion, none of those which follow ever being found exactly over them. Hence from the special appearance of these leaves, according as they have been observed, they have received the name or appellation of *Curvi-serial*. This property is the necessary consequence of the irrational or incommensurable angle, which disperses the leaves in their spiral development, and prevents their touching the same vertical line twice. For the sake of distinction these leaves have been called *recti-serial.* They are placed one above the other, and their entire system is composed of a constant number of alternate leaves or of circles, ranged one over the other. To this class belong those which are distichous, tristichous, quincunx, opposite, ternate, quaternate, and lastly, verticillate. The following is the law propounded by the authors: "between two consecutive systems, there exist as many inter-

mediate leaves as unities in the common divisor of the numbers of the generating spirals, at the point of contact of the two systems."

The continuation of Mr. Arthur Wallis' series of papers on the "Flora of Essex" was read, including the natural orders, *Leguminosæ* and *Rosaceæ.*

INSTITUTION OF CIVIL ENGINEERS.

Papers of which the following are abstracts were read at a recent sitting.

"An account of some experiments to determine the force necessary to punch holes through plates of wrought iron and copper." By Joseph Colthurst.—These experiments were performed with a cast iron lever, 11 feet long, multiplying the strain ten times, with a screw adjustment at the head, and a counterpoise. The sheets of iron and copper which were experimented upon were placed between two perforated steel plates, and the punch, the nipple of which was perfectly flat on the face, being inserted into a hole in the upper plate, was driven through by the pressure of the lever. The average results of the several experiments (which are given in a detailed tabular form) show that

	Inch diam.		Inch thick.	
The power required to force a punch	0.50	Through an iron plate	0.08	is 6,025 lbs.
Ditto	0.50	Ditto	0.17	is 11,950 lbs.
Ditto	0.50	Ditto	0.24	is 17,100 lbs.
Ditto	0.50	Through a copper plate	0.08	is 3,983 lbs.
Ditto	0.50	Ditto	0.17	is 7,883 lbs.

Hence it is evident that the force necessary to punch holes of different diameters, through metal of various thickness, is directly as the diameter of the holes and the thickness of the metal. A simple rule for determining the force required for punching, may be thus deduced. Taking one inch diameter, and one inch in thickness, as the units of calculation, it is shown that 150,000 is the constant number for wrought iron plates, and 96,000 for copper plates. Multiply the constant number by the given diameter in inches, and by the thickness in inches; the product is the pressure in pounds, which will be required to punch a hole of a given diameter, through a plate of a given thickness. It was observed that duration of pressure lessened considerably the ultimate force necessary to punch through metal, and that the use of oil on the punch reduced the pressure about eight per cent. A drawing of the experimental lever and apparatus accompanied the communication.

"On a method of setting out involute teeth of wheels, so that any two wheels of the same or of different diameters will work truly together, whether the teeth bottom or only just touch each other." By Edward Cowper.—The rule is briefly this:—Point off the teeth on the pitch circle in the usual manner; then take the smallest wheel of the set, and having decided upon the depth of the proposed tooth, describe a circle (called the Evolute) touching the bottom of the tooth. On all the other wheels describe evolute circles, bearing the same proportion to *their* respective pitch circles which the evolute circle of the smallest wheel bears to *its* pitch circle;—thus, if in the smallest wheel the evolute circle is 1-12th less than the pitch circle, let all the other evolutes be 1-12th less than *their* pitch circles. From these evolute circles, as bases, describe the involute curves of the teeth, making the curves pass through the points set out for the teeth, upon the pitch line.

"A refrigerator, or machine for cooling brewers' wort." By Robert Davison.—The machine described in this paper was constructed for the purpose of ascertaining the most expeditious process for cooling wort, without deteriorating the quality of the liquor. Two kinds of preliminary experiments were made, viz.:—1st. As to the rate of cooling by simple exposure to the atmosphere in the ordinary shallow vessel, having a superficial area of 420 square inches, the liquor being 1½ inch deep.—2d. As to the rate of cooling, under similar circumstances, with the assistance of air mechanically driven over the surface of the liquor at different velocities. In both cases the loss by evaporation was noted. The numerous experiments are detailed in a tabular form, whence may be selected three series, which will give the average relative results.

Wort cooled.	Naturally under Atmospheric Temperature, 75 deg. min.	sec.	1.—By Blast at the rate of 32 miles per hour. Temp. 65 deg. min.	sec.	2.—Blast at the rate of 47 miles per hour. Temp. 65 deg. min.	sec.	3.—Blast at the rate of 57 miles per hour. Temp. 65 deg. min.	sec.	4.—Blast at the rate of 84½ miles per hour. Temp. 65 deg. min.	sec.
From 160° to 150°	3	33	2	..	1	30	..	41	..	25
From 130° to 120°	8	30	1	10	2	4	1	6	1	7
From 100° to 90°	22	5	6	30	3	41	3	18	2	3

A higher velocity than 84½ miles per hour was found prejudicial, as a portion of the wort was driven over the side of the vessel. The relative loss by evaporation was—

By natural cooling.............. 1.40
By blast, at 32 miles per hour.... 1.45
Ditto at 57 miles................ 1.47

Hence it would appear, that the evaporation effected was about the same in all the experiments: and the rate of refrigeration nearly in the direct ratio of the velocity of blast. These results induced the author to try other applications of the blast, by causing the wort to flow down over a series of slightly inclined planes, being exposed at the same time to a powerful ascending current of air from a fan blower. The introduction of air directly into the wort was, however, found to raise a froth or "fob," which would affect the soundness of the beer. Several other methods were tried, and at length the machine now described was constructed. The wort is pumped up at a slow and regulated speed into a recipient at the top of the machine, divides into a series of thin films or streams, and trickles down the inside of a number of thin metallic tubes, set vertically, with their upper extremities quite level. Up these tubes is forced a current of air at any required velocity, which, meeting the descending wort, cools it inside, whilst a constant change of cold water takes place around the exterior of the tubes. The wort, on leaving the vertical tubes, is received into a second refrigerator, containing a number of horizontal pipes through which cold water flows. By this process the wort is cooled without producing any prejudicial effect upon its quality, and with a rapidity (as shown by the table) which would be extremely advantageous under certain circumstances. This communication was accompanied by two drawings of the refrigerator, and illustrated by a working model with which the experiments had been made.

"Description of a thirty-ton crane, erected on the quay of Earl Gray's dock, Dundee harbour." By James Leslie.—The crane is placed on a stone platform sixteen feet square, raised six feet above the level of the quay, with its centre seven feet back from the dock face; and as the sweep or radius is thirty-five feet to the perpendicular of the jib-sheave, the load is suspended twenty-eight or twenty-nine feet over the dock (as the double or single purchase sheave is used.) The height of the sheave above the level of the quay is forty feet. Instead of the framing revolving about a fixed post, as in the usual mode of construction, the post itself is connected with the framing, and turns with it, so that the strain may be always in the direction of the greatest strength. To avoid the extra dimensions of the casting for the post, if it had been composed entirely of cast iron, and for facility in the construction, the parts of cast and wrought iron are so combined that the "push" is thrown upon the cast iron abutting piece which is placed in front, while the back part, consisting of wrought iron tension bars, bears the "pull." The two rings on the post are turned on the face and edges, and being bolted together, form a fair surface for the friction rollers, while the back forms a rest for the tension bars. These back tension bars are three inches wide by two and a half inches thick each, forming an aggregate section of forty-five inches. They were all proved in the bent form in which they are used, by making fast the ends of each bar to cross heads held apart by two logs, and suspending a load of twenty-four tons from the elbow formed by the bend in the bar; this was calculated to be equivalent to a longitudinal strain of ninety tons. There are also two side tension bars, two inches square each, firmly sunk in the cast-iron block, and bolted to the top of the framing. The post revolves within a cast-iron cylinder twenty-seven feet deep, five feet three inches diameter, with turned and bored water-tight joints. The whole is surrounded with masonry, bound together by strong iron hoops and diagonal tie bars passing through the fixed ring. The jib is of oak two feet diameter in the middle, and twenty-one inches at the ends; the two wrought-iron jib stays are each three and a half inches diameter; the chain is of 1¼ inch iron. Eight men easily lift a weight of thirty tons, and by means of the horizontal wheel-work one man can turn it round. The total weight of the castings, wrought-iron bars, chain and brasses, is about fifty-nine tons. The crane was made and erected by Mr. Borrie, of Dundee, from the designs and under the direction of the author. The communication was accompanied by two elaborate working drawings, on a large scale, with details of the mode of construction.

ZOOLOGICAL SOCIETY.

The ordinary meeting for scientific business was held on Tuesday evening, William Yarrell, Esq., Vice-President, in the chair. A communication was read from Mr. Gould, on that interesting species, the lyre bird of Australia, which was formerly supposed to be allied to the gallinaceous birds, but which was more properly allied to the ground thrushes of South America. This is the shyest of all birds, and although Mr. Gould was surrounded by them, and heard their sharp and piercing cries for days together, he found it impossible to come near them; and this difficulty was increased by their frequenting the almost inaccessible parts of the lakes and ravines. Their food is principally insects, but in some he found the remains of shelled snails in the gizzard, which is strong and muscular. A letter was read from Dr. M'Clelland, giving an account of several birds and quadrupeds for the menagerie, from Upper Assam, which were shipped at Calcutta under the patronage of Lord Auckland. A communication was next read from Sir Robert Heron, on some particular physiological characters in gold fish, one of which he had in his possession for upwards of twenty years. Mr. Yarrell exhibited two rare specimens of the wagtails (motallica), shot in England; and Mr. Broderip exhibited and described several new and beautiful specimens of helix, from the collection of Mr. Cumming, brought by him from the Phillippine Islands. Mr. Gullifer, of the Royal Horse Guards, next read a paper on tho blood corpuscules of the order feræ.

MEDICO-BOTANICAL SOCIETY.

At a meeting of the Royal Medico-Botanical Society holden on Wednesday, J. F. Farre, M. D., in the chair, Professor Roggers delivered an interesting discourse upon the chemical constitution of the algæ, upon the iodine bromine, and other useful medicinal substances obtained from them. He also exhibited and experimented with several valuable chemical tests and re-agents most applicable to detect these substances in vegetable analysis, which led to an interesting botanical and philosophical discussion on several new views and facts connected with the living actions, juices, and structures of plants, and on the most recent chemical tests and re-agents for detecting these elementary bodies, in which Dr. Farre, Mr. Judd, Professor Roggers, &c., took part. One of the members exhibited a portion of a Roman pavement, parts of green, red, and blue ancient glass vessels, and a black mass, which was made out to be burnt barley, and which was found upon a level with, and near to, the recently-discovered Roman pavement under the foundation of the old French church by the Royal Exchange.

EXPERIMENTS WITH THE SAFETY LAMP.

BY PROFESSOR GUSTAV BISCHOF, OF BONN.

Three years ago the Prussian Government charged me with the examination of the means of preventing the dreadful accidents in coal mines, occasioned by explosions of fire-damp. For this reason I have visited many coal mines in the neighbourhood of Saarbrucken, Wellesweiler, Aix-la-Chapelle, and in the Principality of Schaumberg. I have examined into all the circumstances concerning the exhalations of fire-damp, and collected the inflammable gas issuing from blowers in three coal-mines, for the purpose of analysing it.

Experiments regarding the security of safety-lamps are rather difficult. By placing the lamps in a locality filled with an explosive mixture, sufficient results are obtained, provided the place be very large, or if new quantities of the explosive mixture are constantly passing through it. On the contrary, when the quantity of the explosive mixture is too much limited, the intenseness of the explosive mixture within the cage gradually decreases, and the wire-gauze prevents the passage of the flame through it, from not having reached the red-heat. Indeed, a lamp may only be considered as conferring safety, when no communication of explosion takes place when the wire-gauze is perfectly red-hot. Considering these circumstances, it is obvious, that it is only by placing a lamp near the spot where a quantity of inflammable gas is issuing and mixing with the circulating current of atmospheric air to the explosive point, or by conveying a lamp into a very large space filled with an explosive mixture, that its safety can be proved. In order to institute experiments according to the former method, I caused to be made a cylinder of paste-board, twenty-four inches in height, and fifteen inches in diameter. The cylinder was furnished with four small glass windows for observing the phenomena taking place in its interior. The cylinder was closed by a cover and a bottom. The former had five holes, which might be closed up by cork stoppers. The bottom had three holes, one of which was for drawing up the safety-lamp, the second for admitting the inflammable gas, the third for the penetration of the atmospheric air into the cylinder. This apparatus was fastened near the blowers, and the inflammable gas introduced through a tube stuck into the fissure from which the gas was issuing. The safety-lamp, suspended to a wire going through the cork stopper in the middle hole, was drawn up into the cylinder. By opening or closing up the other holes, the circulation of the explosive mixture formed in the interior of the cylinder was regulated in such a manner as always to surround the safety-lamp with new quantities of it. There were different layers of gas in the cylinder; at the top for the most part the light inflammable gas, at the bottom chiefly the atmospheric air, but in the middle there was an explosive mixture of the strongest exploding power. It was, therefore, evident that the safety-lamp near the bottom scarcely ascertained the actual presence of the fire-damp, whilst at the top it was soon extinguished. But in the middle of the cylinder the phenomena depending on the presence of the explosive mixture took place in the most powerful degree. The flame of the lamp increased not only to the top, but it was there bent down, and the whole cage filled with fire. In this part of the cylinder the safety-lamp remained from fifteen to twenty minutes, provided that no inflammation through the wire gauze took place. The latter was, for the most part, red hot. The lamp was, for some time, put in pendulum motion, which was as violent as possible, in order to imitate the passing of the workmen in the mines where inflammable gas prevails. On another occasion the lamp was held obliquely, in order that the increased flame might reach the wire gauze. I wished to examine the safety-lamps, not only relatively to the greatness of the apertures of their wire-gauzes, but also to that of their diameters. I had six kinds of wire-gauze of brass made, and five cylinders were made of different diameters of these six sorts. Therefore thirty cylinders were obtained, the number of the apertures and the greatness of the diameters of which are the following:

Number of apertures to sq. inch.	DIAMETERS IN LINES. 18 5	21·5	26·	28·	37·
380	No. 1	No. 2	No. 3	No. 4	No. 5
308	6	7	8	9	10
184	11	12	13	14	15
162	16	17	18	19	20
104½	21	22	23	24	25
58*	26	27	28	29	30

* The apertures were not quite strictly squares.

I employed, as is evident, wire-gauzes of much larger apertures than are usual in coal mines, for I had in view to find the maximum at which they are not permeable to flame. For these thirty cylinders of wire-gauze, five lamps were made, the size of which accorded with that of the cylinders. The forms of these lamps were in general like those constructed originally by Sir H. Davy himself, but the cages made of platinum wire were wanting. The results of my numerous experiments are—first, cylinders of 104 apertures to the square inch, are perfectly safe when placed in the apparatus filled with the strongest explosive mixture, formed by the blower in Gerhard's mine, but cylinders of fifty-eight apertures are no longer safe. Secondly, the diameter of the cylinders of 104½ apertures may increase to two inches without a decrease of their security being observable.

I shall now give an account of experiments made on such a largo scale as to afford results of the most exact kind. I caused an excavation of 14 feet in height, 5 feet in length, and 3½ feet in breadth, to be made in a coal stratum, in the vicinity of the blower of Gerhard's gallery, This excavation, called in Germany, "Uebersich brechen," being above the gallery, experimenters standing in the latter, where there was good ventilation, were enabled to make their experiments without danger. The excavation was soon charged with fire-damp. The lamps from No. 1 to 13 were in succession drawn up into the excavation, and remained in it from five to ten minutes, during which time they were strongly agitated. Though the effects produced by the explosive mixtures were very vehement, for the wire-gauzes became quite red-hot, the whole cylinders were filled with fire, the oil began to boil, and a humming noise like that of the chemical harmonica was heard, yet the wire-gauzes remained quite impermeable to flame. Some of these lamps, drawn up too high into the excavation, were extinguished. The lamp No. 3 fell down, as the pack-thread by which it was suspended was burned, but an explosion did not take place. No. 5 caused, it is true, an explosion, but it was found that the wire-gauze, from its having remained for eight minutes in the explosive mixture, had suffered oxidation, and had fallen to pieces. On the contrary, the lamp No. 14 instantly effected an explosion, before the wire-gauze became red-hot. It was, therefore, not necessary to employ the lamps after No. 14, as they would doubtless have given the same results. While in the apparatus, the cylinders having 104 meshes to the square inch were found perfectly safe, a cylinder of 184 meshes, and twenty-eight lines in diameter, effected an explosion; the reason of this unequal result, no doubt, depending on the circumstance that the apparatus contains 2½ cubical feet of explosive mixture, but the excavation 233 cubical feet. From this is to be seen the importance of making experiments in such large spaces, in order to prove the security of the safety lamps.

Similar experiments were also instituted in an excavation made in the coal strata of Wellesweiler. The phenomena were in general the same, but the results rather different, though strictly in accordance with the results of the chemical analysis. The lamp No. 8 was quite safe, but No. 9 and No. 10 produced an explosion. No. 13 likewise produced instantly an explosion; therefore these three lamps, which were quite safe in the former excavation, produced in the latter an explosion. So large as these excavations were, it is nevertheless to be remarked, that the experiments give sufficient results only when the disengagement of the fire-damp from between beds of coal takes place in the same proportion as is consumed by burning the safety-lamps. On the contrary, the vehemence of the effects gradually decreases, and no safety-lamp can produce an explosion, as it would have done provided the explosive mixture had been there in its strongest form. The officers of mines, who made the latter experiments enumerated, have had a favorable opportunity of inquiring into the circumstances taking place when the fire-damp is in violent motion. A gallery 35 feet in length, 5 feet in height, and 4 feet in breadth, rising at an angle of 20 degrees, was filled with about 300 cubical feet of explosive mixture. Against this gallery another one was carried. Through the intervening space between these two galleries a hole of one inch in diameter, and forty inches in length, was bored and closed up by a stopper. On approaching a safety-lamp of 900 apertures to the square inch to the hole, and on opening the stopper, the presence of fire-damp was ascertained by the flame being increased nearly by one inch. But the streaming of the air was so vehement, as to push the flame by half an inch aside, and at last to extinguish it. Other safety-lamps, of 308 and 184 meshes to the square inch, gave the same results. Lastly, a common mining lamp was placed before the hole. The flame of the lamp was pushed 1½ inch aside, and was blue colored, but did not kindle the fire-damp which was streaming out. On removing the lamp, the blue flame disappeared, without being extinguished. From these observations it follows, that the inflammation of the gas issuing from the hole, and kindled by a lamp, is not continued backwards; and this is owing to the strong streaming of the gas. Hence it appears to follow, that if holes are bored against a rising gallery filled with an explosive mixture, an explosion is not to be feared with a common lamp, and still less with a safety-lamp.

The experiments enumerated show, that in many coal mines wire-gauzes of larger apertures than now in use may be employed. Such a contrivance would be useful to the workmen, as complaints are frequently made of the obscure light afforded by the safety-lamp. Indeed, I have had myself opportunities of observing this during my frequent visits to mines filled with fire-damp. The size of the apertures in the wire-gauzes employed in any coal mine may be easily ascertained by experiments in excavations made in the mines. But even in coal mines charged with the most dangerous explosive mixtures, wire-gauzes of 620 apertures to the square inch, appear to restrain the flame within its narrow bounds, and to prevent explosions.

SCIENTIFIC MEMORANDA AND NOTES ON ART.

Transfer of Oil Paintings.—The historical painter Leipmann, the inventor of the plan of taking impressions of oil paintings, has received a pension from the King of Prussia of 500 thalers, on condition that he shall make known his secret, and give a description of all the experiments he has made. He is also required to give his assistance in perfecting the invention if desired.

Discovery of Mosaic Pavement—Some excavations recently made at Salsburg, in the Tyrol, for the foundations of a monument to Mozart, have led to the discovery of a Roman mosaic pavement, such as was usually placed in the courts of buildings of importance. The municipality has ordered the works for the monument to be suspended, and further excavations in search of antiquities to be made round the spot.

A Seal of the Pretender.—A few days ago a person digging in the garden of Mr. Duncan M'Alpin, at Blackhall, near Carlisle, found a curious seal, which appears to have belonged to one of the followers of the young Pretender, or the Chevalier Prince Charles, during the rebellion of 1745. The seal bears a half length portrait of that extraordinary person. He wears a bonnet and a plaid, with a broad belt over his left shoulder, ornamented with a rosette. A star glitters on his breast. His hair is rather long and is secured behind by a riband. It is probable that the seal may have belonged to one of his adherents, who might lose it while in attendance on the young chevalier. He slept at Blackhall on the night of Sunday, the 15th of October, 1745, when Carlisle was invested by his troops.—*Edinburgh paper.*

Typographical Wonders.—The *Times* has recently brought out several double-double sheets. Each of these publications is estimated to contain 1,174,762 letters, and if the lines were joined in one continuous line they would reach nearly one mile. The lines of the whole of one impression if thus joined together would reach more than two thirds round the globe.

Turpin on the Globules of Milk.—They vegetate and nourish themselves in the fluid in which they float, exactly like the globules of the blood, the lymph or nervous mass, or the bulbs of the hair; in short, like all those elementary organisms, of which the organic structure consists, and which derive their support from the surrounding slimy fluid. They are composed of two vesicles, and contain smaller globules, together with oil producing a greasy substance; their size extends to 1-100th of a millimeter; when exposed to some degree of warmth they become four times this size, and then burst. They still vegetate in an independent manner, as the outer skin breaks, and pushes out the inner branches, which become entangled like the axes of potatoes germinating in a darkened cellar. They at length become *Penicillum glaucum*, and plant themselves by means of buds and seeds, particularly on the surface of milk, of cream, and of cheese. If the globules are placed between two glasses with a little water they soon germinate, and change to the *Penicittum glaucum*, which radiates on all sides and bears fruit. They may be preserved in this manner for a whole year. The sleep-apples (Schlaffäpfel) of the rose, the excrescences of which, under the name of *Erincum*, were conceived to be fungi, are no more independent plants than the hairs of animals are independent creatures. If, however, in the one case the cells, and in the other the bulbs of the hair, did not come forth till after the death of the body, we should consider them as independent plants. This is the case with the globules of milk. What then can a portion of organic matter be said to be? Nothing but a mass of innumerable globules endowed with vital energies, which only wait a favorable opportunity to develope themselves. The leaven of bread, according to Cagnard Latour, is nothing but a similar mass of globules. I, therefore, perceive no difference between the globules of milk, and the cells of animals and of plants, which are prolonged into hairs.—*Microscopic Journal, No.* 2.

Carbonate of Baryta.—At a late meeting of the Wernerian Natural History Society, Dr. Traill exhibited specimens of witherite, or carbonate of baryta, from a new locality in Wales, and made remarks on the mine from which it is extracted. This mine is close to the right side of the public road leading from St. Asaph to Holywell, about three miles from the former town, among the clay slate mountains that form the eastern boundary of the fertile valley of Clwyd, and near the junction of the slate with the mountain limestone; it is in the mining district of Rhualt, and the mine where it is chiefly found is named the "Pennant Mine." The entrance to the veins containing it is by an adit near the road, which serves as a drain to the workings in the upper part of the hill, with an inclination from its upper part to its exit of twenty-five feet. The carbonate is found in veins along the adit, and descending below it, and is mixed with sulphate of baryta and some galena, but the principal product of this part of the workings is the carbonate, which occurs in such quantity as to become an object of mining industry. It is sold, like the sulphate of the same earth raised in the upper part of the vale of Clwyd, the Isle of Arran, and Renfrewshire, for the avowed purpose of adulterating white paint, and is more difficult of detection than the other adulterations, because it effervesces with, and is soluble in, muriatic or hydrochloric acid. It is also sold on a more limited scale for chemical purposes. We have now, then, in Southern Britain, five great localities of carbonate of baryta—Anglezark in Lancashire, Aldstone Moor in Cumberland, Arkingarthdale, or Arkindale, in Yorkshire, Snailbeach in Shropshire, and Rhualt in Flintshire.—*Mining Journal.*

On Promoting the Germination of Seeds.—Many plans have been recommended and adopted for assisting and insuring the growth of those seeds which are of difficult germination—such as keeping them in solutions of iodine, chlorine, &c., and happily with success. By certain chemical stimuli, the tardy and latent vital principle of seeds may be excited into action. We must not, however, confound and degrade the operation of the vital principle into mere chemical action; the chemical phenomena are developed as soon as the wonderful operations of this principle are observable. Of all chemical agents, perhaps, none exert a wider and more powerful influence than light; in the vegetable world its effects are manifest and important, the very color of plants and flowers being dependent on it; when it is withheld, color is lost, as in the familiar example of bleaching celery. I make these general observations, respecting the great influence of light in vegetation, in order to bespeak attention to the contrivance I now recommend for promoting the germination of seeds—the application of the chemical stimulus of light. It is simply the placing a square of violet-colored glass over the top of the flower pot in which the seeds are sown. It will be found that seeds exposed to the influence of this violet-colored light will vegetate more quickly than when covered with common stained glass, or with glass of any other color. The explanation is this: when a ray of light is transmitted through a prism, it is divided into seven component parts—red, orange, yellow, green, blue, indigo, and violet. Now it is proved by experiment that the violet-colored ray possesses by far the greatest power of producing chemical action; next to it the indigo, then blue, green, and so on up to the red ray, which possesses no chemically acting power whatever; on the contrary, the red ray has the greatest heat-giving power, while the violet, the opposite end of the spectrum, exhibits scarcely any. As chemical stimuli are known to promote the germination of seeds, this of the violet-colored ray of light, as transmitted through a square of stained glass, will be found of the greatest possible efficacy.—*F. R. Horner.*

VARIETIES.

Importation of Giraffes.—M. Riboulet arrived at Portsmouth on Saturday, with five giraffes, which he caught himself young in Abyssinia, and which have been exhibited here during the past week. This enterprising traveller had captured six of these beautiful creatures, but in hoisting one of them on board the Great Liverpool it struggled so that the crate gave way, and he so injured himself that it was found necessary to destroy him.—*Portsmouth paper.*

Launch of the Agincourt.—This fine vessel was launched from the yard of Messrs. Green and Wigram, at Blackwall, on Saturday last. She is intended for the India trade; her measured tonnage is 1,067 tons, being 17 tons burden beyond the *Southampton*, which was launched on the preceding Tuesday. She is perhaps the best model of a merchant-ship that has ever been constructed in the yard of her owners, being built upon the newest improvement in naval architecture.

Steam Regularity.—At a dinner of steam-boat proprietors at the City of London Tavern, on the 5th inst., Mr. Wolverly Attwood, M. P., in the chair, Mr. Christopher Claxton, the managing director of the Great Western Steam-ship Company, in eulogizing the excellence of the Great Western's machinery, which had carried her nearly 130,000 miles without a disappointment, or missing her advertised hour of sailing, stated that he felt confident in predicting that at half past 2 o'clock on the 14th the Great Western would arrive in King-road. At that very time her smoke was seen from the hills in the neighbourhood of King-road, and she anchored at 7 o'clock.

Increase of Letters sent by Post.—In the course of a paper drawn up by Mr. Rowland Hill, and entitled "The Results of the New Postage Arrangements," which was read to the Statistical Society, the 17th May, it was stated that the present rate of increase on all letters is 21 per cent. per annum, or upwards of 40 per cent. on the original number; and should this rate of increase be maintained, and each succeeding year bring an augmentation of 21 per cent. as compared with the year 1840, the complete restoration of the gross revenue will be effected in about three years and a half from the present time.

Penny Postage in the London District Post.—The revenue in this post (after deducting the receipts on general post letters collected by this department) for the year 1838—the last year totally unaffected by the great reduction of rate—was £118,000; for the year 1840, about £104,000; so that an increase of £13 per cent. only is wanted to make the revenue of 1840 equal to that of 1838. But the present rate of increase in the number of letters is 14 per cent. per annum; so that assuming this rate of increase to continue, the lapse of another year is all that is required for the complete restoration of the gross revenue of this department.—*Mr. Rowland Hill's Postage Paper, read before the Statistical Society.*

Westminster Bridge.—This bridge has been re-opened for the transit of carriages and vehicles of all kinds, after having been closed for some weeks. The carriageway has been much lowered, and the effect of the repairs and alterations that it has undergone is, that the ascent towards the centre of the bridge is much decreased, which is a decided improvement.

New Entrance to Hyde Park.—Numbers of workmen are busily employed in taking down the brewery recently belonging to Messrs. Goding, at Knightsbridge, on the site of which are to be erected splendid foot and carriage gates, with a keeper's lodge, to be named Prince Albert's Gate. Surveyors have also been taking plans for the erection of splendid mansions, the front of which will be towards the park, extending from the new entrance nearly to Hyde Park Corner. The small old houses and shops on that side are speedily to be removed for that purpose.

Eyes of Different Colors.—At a coroner's inquest held on Monday, a little girl who was examined as a witness attracted much attention, from having differently colored eyes. In one of them the iris is a pale blue—a blue of the lightest possible tint; and in the other it is a brilliant dark brown. The contrast is most striking, and it is said to be especially remarkable at night by candlelight, when the dark eye seems to be quite black. She can see equally well with both eyes, which are perfectly clear and unblemished. The girl was born in that state. Her complexion is fair, with a red tint in the cheeks, but her hair is inclined to the color of the dark eye. The eyes of the mother were dark.

Child-birth in a Railway Carriage—On Thursday, as the six o'clock down railway train was on its road to Hull, when between Castleford and Selby, a poor woman, third-class passenger, was safely delivered of a child.—*Hull Gazette.*

Occupations of Persons Taken into Custody in the Metropolitan District in 1840.—No less than 70,717 individuals were taken into custody last year, and according to the returns in the police sheet, there were—Labourers generally, 18,105; artisans, 123; bakers, 141; bookbinders, 218; bricklayers, 908; brass-founders, 287; brokers, 91; brush-makers, 146; butchers, 754; button-makers, 10; carpenters, 1,523; clerks, 405; coach and cabmen, 1,319; coach-makers, 273; cork-cutters, 92; curriers, 151; cutlers, 159; drapers, 138; dyers, 220; engineers, 101; fishmongers, 202; French polishers, 709; gardeners, 523; glass makers, 155; gold beaters, 88; green-grocers, 85; grocers, 247; hair-dressers, 142; hatters, 196; jewellers, 178; lawyers, 29; laundresses, 1,040; medical men, 72; milliners, 1,091; musicians, 69, painters, 1,111; paper-stainers, 431; pawnbrokers, 71; printers, 509, sailors, 1,681; sawyers, 246; saddlers, &c., 181; servants, 2,563; shopkeepers, 107; shoemakers, 1,967; smiths, 1,143; soldiers, 464; sweeps, 300; tailors, 2,043; tinkers and tinmen, 418; tool-makers, 56; watch-makers, 203; watermen, 280; weavers, 740; and persons professing no distinct trade or occupation, male and female as above, amounted to 25,220. The above table also shows the degree of instruction of each person so taken into custody. Those who could neither read or write amounted to 23,938; those who could read only, or read and write imperfectly, were 37,551; those who could read and write well, 8,121; and those of superior instruction, were 1,107; thus showing, that in proportion to education, crime diminished.

New Iron Mine.—We understand that a valuable vein of iron stone, from five to six feet thick, and of great extent, has been found near Wolsingham. It is said that a company in this town intend to commence working forthwith; and it is expected that the West Durham Railway will be extended to the neighbourhood.—*Tyne Mercury.*

The Iron Trade.—A meeting of the principal ironmasters of the neighbourhood of Wolverhampton was held on the 5th instant, at which it was determined that fifty furnaces should be "blown out," viz., thirty-five in Staffordshire and fifteen in Shropshire.

Iron Mines in the Highlands.—We understand that the Duke of Richmond has had a number of workmen employed for some weeks past in the mountains of Strathdoun, on an experiment to try the practicability of working the minerals discovered there last season. The metals were submitted to an eminent chemist, and on analysis gave the most promising result. The long land carriage is the most serious impediment to the successful working.—*Aberdeen Journal.*

A Worm Imbedded in Stone.—A few days ago as some workmen were employed in a quarry on the Kirkharle estate, Northumberland, they discovered a worm, about three inches long, and half an inch thick in circumference, embedded in the solid free-stone. After exposing it to the air three or four minutes, it died.—*Tyne Mercury.*

FOR SCHOOLS AND FAMILIES.

Just published by

J. Souter, School Library, 131, Fleet-street, London, and may be obtained through the medium of any local bookseller or stationer throughout the kingdom.

ELEMENTARY COPY-BOOKS:—An improved plan of Teaching Penmanship; whereby the learner's progress is secured, and the labor of the teacher greatly facilitated. By B. F. Foster, author of "The Theory and Practice of Book-keeping Simplified," "Prize Essay on the best Method of teaching Penmanship," "The Art of Rapid Writing Illustrated," &c.

TO PARENTS AND TEACHERS.

To obviate the difficulties that impede the progress of learners, and to furnish schools with a simple, rational, effective, and cheap* system by which the art of writing can be taught at the least expense of time and labor, is the design of this improvement. Its more prominent features are as follows:

1. The process of instruction is developed in a series of copy-books of a decidedly practical character. Directions for the position of the body, pen, and paper are printed upon the cover of each book, and illustrated by engravings, so as to be easily comprehended by the learner.

2. The exercises are progressively arranged—beginning with the simplest rudiments, and leading step by step to a finished Current-hand. Copies are printed upon each page throughout the books; thus saving the drudgery and often imperfectly performed task of setting them, the labor of ruling, and also the expense of "copy-slips."

3. In the initiatory course, the component parts of letters are "pencilled," as guides for the pupil; and the slope and relative distance of the downstrokes are indicated, so that the child cannot deviate from his copy without perceiving his error at the moment. In short, every facility is afforded in this system for the speedy and perfect attainment of the art. The teacher has merely to see that his pupils apply themselves to their tasks with proper care and diligence, and the result must be satisfactory.

₊ When two gross are ordered at one time, the name and address of the school will, if required, be printed on the cover without extra charge.

DESCRIPTION OF THE COPY-BOOKS.

No. I is designed for beginners. The exercises consist of straight strokes, combined with top and bottom turns; each page being pencilled for the pupil. The aim of this book is to strengthen and discipline the muscular powers of the fingers, and to initiate the child into a correct method of holding and conducting the pen. The only effective means of attaining this end is to practise, from the first, characters of a very large size, which practice cannot be too strongly insisted upon.

No. 2 is a continuation of the same practice on the simple elements; the characters being reduced in size, and the guidance confined chiefly to slant and distance, by means of diagonal lines. A due attention to the exercises in this book will prepare the learner to commence with

No. 3, which is also a continuation of practice on the elementary characters; but the combinations are more difficult, and the guidance is omitted at regular intervals, in order to discipline the eye, as well as the hand and fingers. The oval letters o, e, c, a, and the compound turns, in, en, un, on, &c. are here introduced with guidance.

No. 4 contains all the letters of the large-text alphabet, with their more difficult combinations, and text words; the guidance being still continued. This book completes what may be termed the initiatory course, so far as regards text hand.

No. 5 consists of the Capital Letters, text size, pencilled for the pupil, and arranged according to similarity; the guidance being omitted at intervals as before, so as to test the pupil's skill and efficiency, and to prevent any thing like careless or improper habits in the formation of the letters.

No. 6 consists of alphabetical copies and words, three sizes, namely, Text, Medium, and Small-hand, alternately, with a certain degree of guidance at intervals, as the nature of the case may require.

Nos. 7 & 8 are designed to develope an improved process of teaching current-hand; the result of much study and practical experience in this department of the art.

The principles upon which "Foster's Elementary Copy-books" are constructed were suggested by Locke: "The way to teach a child to write without much trouble," says this philosopher, "is to get a plate engraved in large characters, and let several pages be printed in red, which he is to go over with a pen and black ink; this will quickly bring his hand to the formation of those characters. He must then exercise on fair paper, and in this way he may easily be taught to write." This is undoubtedly correct; for while "tracing" characters his copy is immediately under the eye and hand, and he has only to confine his attention to the manner of holding and conducting the pen. Skill is the effect of habit. By repeatedly doing a thing in the same way a confirmed habit will be formed of doing it correctly; but by the ordinary process of teaching, the letters are, nine times in ten, made improperly; and hence, instead of amendment, every repeated effort confirms a bad habit, which effectually prevents the learner from attaining an easy, elegant hand. The mother assists her infant in its first attempts to walk, until the muscles and limbs have acquired the requisite degree of strength, and why should not the child receive all the aid possible in his first and feeble efforts with the pen?

There is, we are aware, a difference of opinion among teachers in regard to the utility of the plan here recommended. The objection made to "tracing" is, that it "has a tendency to prevent the education of the eye." To some extent this may be true; but the objection is more specious than sound. In order, however, that the eye may be disciplined as well as the fingers, the guidance in these copy-books is taken away at intervals, and by regular gradations, in such a manner as to produce the desired effect.

A prominent defect in teaching penmanship is the almost total neglect of its Elements; the pupil, being indulged in that prurient desire which children so often display, is hurried on, and permitted to write small-hand before he can draw straight or parallel strokes. This is a radical error; for if, before we are versed in the rudiments of an art, we ascend precipitately to its more difficult parts, the foundation of our knowledge is defective, and the superstructure which we have reared upon it will be insecure.

The importance of establishing, at the outset, a correct habit of holding the pen is too obvious to be insisted on. Now, a child cannot form letters of a large size correctly, unless the pen be held so that both sides of its nib may have equal stress on the paper; and as this is an essential requisite the elementary exercises should be such as will compel him to manage the pen properly from the first. We are convinced, that the most speedy and effectual means of attaining a free, legible, business style of writing is to commence with the component parts of letters on a large scale,† and continue to practise large Text, Medium, and Small-hand, reducing the size gradually, till each can be written with facility and correctness. The peculiar advantages to be derived from the practice of large-hand are:

1. It prevents all cramped, awkward habits of holding the pen, and serves to imprint upon the mind an exact idea of the form of the letters.

2. It developes, strengthens, and disciplines the muscular powers of the fingers, and imparts a facility and ease in the use of the pen which cannot be obtained by any other process whatever.

A superior commercial hand is not readily attained. Writing is, in fact, a difficult art to acquire; and, from the very nature of the case, there is no possibility of excelling in it but by long and attentive application. "Notwithstanding the various contrivances to facilitate the acquisition of knowledge," says Knox, "great and persevering industry is absolutely necessary to secure any valuable or distinguished improvement." The folly of pretending to impart "in a few easy lessons" that skill and dexterity which are indispensable to a free use of the pen, could only be equalled by professing to enable a child to rival Paganini on the violin in the same period!

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† It is a mistaken notion to suppose that large exercises are too difficult for young children; the truth is, that a child seven years of age, if properly taught, can form letters an inch in height far easier than he can form small m's. Large-text should be written by the combined movement of the hand and fingers.

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ACTS OF PARLIAMENT.

Patterns,—

27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17. (The last relates to patterns and *models.*)

Patents for Inventions,—

2 and 3 Victoria, c. 67.

Sculptures,—

38 Geo. III., c. 71.

Engravings,—

7 Geo. III., c., 38; 17 Geo. III., c. 57.

Copyright,—

8 Anne, c. 19; 12 Geo. II., (Booksellers' Act), c. 36; 15 Geo. III. (Universities' Act), c. 53; 54 Geo. III. (General Copyright), c. 156.

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THE

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A WEEKLY BRITISH AND FOREIGN MISCELLANY OF SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

FIAT JUSTITIA, RUAT CŒLUM

No. 97.] SATURDAY, JUNE 5, 1841. [PRICE FIVEPENCE STAMPED. CIRCULATING FREE BY POST.

APPARENT ABSORPTION OF HEAT BY EXPANDING STEAM.

We alluded last week to some inconsistencies in the propositions usually laid down regarding the quantities of heat, or caloric, contained in steam of different densities. We confess it is difficult to reconcile the different statements on this subject, and it is to be desired that a series of well-considered and accurately-conducted experiments were undertaken with a view to remove, if possible, the various discrepancies, and to establish some indisputable consistent rules respecting the nature and action of so valuable an agent. The uncertain state of knowledge in regard to the power of steam must necessarily lead to numerous impracticable attempts to apply it efficiently, and serves to throw doubt on the efficacy of the best-contrived arrangements for its application. It is, therefore, that we find the principle of working steam expansively still a moot point, notwithstanding reasoning and practice combine to show its advantages. We explained in a recent article the nature and extent of those advantages; we now propose to examine the objections raised to the expansive principle, and to endeavor to point out their fallacy.

In the annual report of the council of the Institution of Civil Engineers the communication from Mr. Palmer, on the application of steam as a moving power, is referred to, in which, it is observed in the report, "the author, reasoning on certain data as to evaporation and on the physical facts which involved the constancy of the latent and sensible heat in steam of all elasticities, and of the absorption of heat by matter on dilatation, came to the conclusion that no power could be gained by expansive working." This conclusion we conceive must have been arrived at from confounding the quantity of absolute with that of latent heat in the volumes and in the weights of steam, an error into which persons speculating on the properties of steam are very liable to fall.* It is, for example, imagined by many, that as steam of two atmospheres and 250° of temperature is said to contain 952° of latent heat, the same steam if expanded to twice its volume, of the temperature of 212°, must, as it contains in each volume 990° of latent heat, have the actual quantity of heat doubled as well as the volume of the steam. If this were so, the caloric thus absorbed by expansion would be so much abstracted from the heating power of the fuel, consequently there could be no gain of power by such an application of the elastic force of steam.

But if experience of the advantages of working steam expansively were not sufficient to prove its saving of power, a consideration of what would be the necessary effect, were double the quantity of heat to be absorbed by expansion, must, we should think, soon determine the question. The cylinder of an engine worked expansively, that was kept apart from the boiler, would in that case soon have its heat abstracted to the condensing point, and the steam within it would be condensed into water, instead of being expanded. Even were the cylinder inserted in the boiler, its heated surface would not be enabled to supply the rapid demand of the expanding steam, and condensation would shortly ensue. There is no condensation of steam, however, in the cylinder of the Cornish engines, though the expansion in some cases amounts to upwards of four times the original volume of the steam.

All difficulty on the point of the gain of working power derivable from expansion will be removed by considering that the quantity of absolute heat in steam is not to be estimated according to the volume, but to the weight or density of the steam. The experiments undertaken by Mr. Watt, with a view to the practical application of aqueous vapour produced at pressures lower than that of the atmosphere, are in accordance with the results we arrived at in experimenting on high pressure steam, viz., that a given weight of steam of all densities contains the same quantity of heat, and that in proportion to the increase of the sensible heat, the latent heat is diminished. Mr. Watt found that water may boil *in vacuo* at a temperature of only 70° Fahrenheit, but that the vapor when condensed gives out a much larger proportion of heat than steam at 212°. The latent heat of such vapour he ascertained to be from 1200 to 1300°, instead of 955°, which was his estimate of the quantity of latent heat in steam of the pressure of the atmosphere. Later experiments, indeed, give the quantity of latent heat greater than stated by Mr. Watt, and his experiments are at variance with others which exhibit the latent heat of steam to be the same at all densities. But if we take either of these results—whether we assume the absolute quantities of heat in steam to be always the same in a given weight, or found our calculations on the constant quantities of the latent heat—we shall perceive that the objection to the expansive working has no good foundation.

Assuming, for example, that the latent heat of steam is the same at all densities, and that the quantity of it in steam of two atmospheres amounts to 950°, let us consider what will be the effect when one ounce of such steam, occupying about half of a cubic foot, is expanded to twice its bulk. The latent heat of the increased volume would still be 950°, but the absolute quantity of heat in any given volume of the steam would be only one half; that is to say, if half the expanded volume of steam were condensed, it would only produce one half the quantity of water that would result from the condensation of an equal volume of steam of double density, and it would give out only half the quantity of heat. We thus perceive, that high pressure steam contains as much absolute heat in its compressed form as the same weight of steam does when expanded, and that there is consequently no necessity for an absorption of heat from other sources than the steam itself during the expansion.

It is the absolute quantity of heat required that is to be considered in practice, and not the latent heat; for the latter has always reference to the quantity of water, into which it would be condensed. Though the temperature, indicated by the thermometer, of steam when expanded to twice its volume, is comparatively little less than that of the steam before expansion, and their quantities of latent heat are assumed to be the same, the amount of absolute heat in the larger volume is not greater than in the smaller.

The difficulty that has often arisen in considering the properties of steam arise from a confused idea of what is meant by its latent heat. The proportionate quantity of hidden heat is the same in a cubic inch as in a cubic foot of steam, the signification of the term being merely that if any given weight of water is converted into steam there is a certain quantity of heat absorbed without any increase of the sensible heat. But though the proportionate quantity of latent heat in a cubic inch and in a cubic foot of steam are

* An error of this kind was inadvertently committed in the *Inventors' Advocate* last week. We regret that in the article on the economy of high pressure steam, owing to its being too hastily written, there was a confusion in several instances of the volume for the weight of steam, which renders the article in some places erroneous and unintelligible.

the same, the absolute quantities of heat in each, if the steam be of equal density, will vary in exact proportion to their respective volumes; just in the same manner as a pint of water at the boiling point indicates by the thermometer the same temperature as a gallon, though the latter contains eight times the aggregate quantity of heat.

VENTILATION OF MINES.

A correspondent of the *Fanal*, alluding to a recent article, which we translated from that paper, on the plan of ventilating mines by a pneumatic Archimedes screw, the invention of which was attributed to a Russian general, says that the plan has been in operation for some time in one of the coal pits at Couillet, and that M. Motte is the inventor. The following is the description given of M. Motte's contrivance, and of the effects produced by it.

"M. Motte has invented a pneumatical Archimedes screw, composed in the first place of a cylinder placed vertically, communicating at the lower end with the gallery to be ventilated, and at the upper extremity with the atmosphere; of a screw, to which is attached a pulley placed in the cylinder, with which it has a common axis; and of a small steam-engine, the piston-rod of which acts directly in turning the fly-wheel, which being connected with a large pulley, round which a band passes over the pulley of the screw, turns it on its pivot in such a manner as to catch in its course the air which rushes to the lower end.

"M. Motte sent a paper to the Academy of Sciences and Belles Lettres of Brussels, at the meeting in 1840, in answer to the following question:—'To investigate and discuss the method of removing the difficulties attending the working of coal mines, by rendering them less liable to explosions.'

"A medal of approbation was awarded to M. Motte, his paper was one of the five of which Government ordered 2,000 copies to be printed. But, as was observed by the experienced chief-engineer of the mines, and reporter of the meeting, the ingenious idea of M. Motte deserves to be put to the test of experiment, for it is scarcely possible not to acknowledge the advantages of the proposed machine. We do not live in the country of Watt and Bolton, and M. Motte who is not a proprietor or director of mines might have had his invention lain dormant, had not M. F. Spitaels, whose name is often connected with the progress and improvements of industry, directing manager of the establishments of Couillet, and one of the directors of the coal mine of Monceau-Fontaine, authorised M. Motte to place his apparatus on the pit No. 7 of that coal mine. It has been in operation there since the 15th of last July. It is worked by means of a steam-engine of two horse-power; it produces excellent ventilation in the works, which in an extent of 2,400 metres contains six galleries in full operation, giving employment to 90 workmen, and furnishing a daily supply of 400 hectolitres of coal. The directors of the society of Monceau-Fontaine have been so entirely satisfied with the result of M. Motte's apparatus, that in the same coal mine, they intend substituting for those enormous blowing machines which require a steam-engine of 24 horse power, a screw which will produce a similar effect by means of a steam-engine of only 2-horse power.

"The apparatus of M. Motte is made use of in the ventilation of an old coal mine. By its means a current of air is circulated with such rapidity, that during the extreme cold of last winter, the water filtering through the roofs of the galleries, became congealed and formed immense icicles, which threatened danger in their fall; they were, however, easily removed, by causing the screw to act in an opposite direction, and in a short time the heated air of the works, forced through the shaft, melted all the ice. The effects produced by M. Motte's machine have been examined by many directors of coal mines. M. Gonot, the directing engineer of the mines of Hainault, has paid very particular attention to them both, and has gone into the galleries at the time when they are worked, and when the works have been suspended, and no one is better able than he to form an opinion of the advantages attending the process, of which he has now had ten months' experience.

"The apparatus of M. Motte, the expense of which is about 300 frs. without the engine, compared to the immense fanners employed for some years in certain coal mines of Hainault and Liege, is attended with a considerable saving of expense in fuel, greasing, and repairing; it not only saves the lives of so many fathers of families, but by continually replacing with wholesome air, the air of the mines which has become vitiated by frequent and sometimes by abundant emanations, occasioned by various causes, it preserves the health and bestows longer life on multitudes of brave and honest workmen, exposed to all kinds of dangers. It is then to be wished that the benefits arising from it should be extended to all our provinces. The companies who use the old pneumatic machines, will find it make a wonderful difference in their daily expenditure, in addition to which no expense will have to be incurred in its first erection, for the proceeds from the sale of their engines of 12, 15, 18, and 24-horse power would very considerably exceed the amount requisite to replace those of M. Motte."

NEW ANTHRACITE COLLIERY.

In our last we noticed the opening of a new anthracite colliery on the line of the Llanelly Railway. The following account is from a correspondent:—On Tuesday se'nnight, we saw one of those successful results of science, which distinguish our times, and create an epoch in the history of the locality which may have the good fortune of being the witness of the achievement. On the day named, there were brought down the Cwm Amman Railway to this port, upwards of 100 tons of as fine anthracite coal as ever was shipped, and far superior to anything shipped here before. It is the first product of an extensive field of that coal now opened, under the direction of Mr. R. Hopkins, by the Gwaun-cae-gurwen Anthracite Company. What constitutes the achievement may be found in the fact that this large field of splendid coal, which is raised to the top of a mountain some twenty miles off, has been easily brought to this port by the united aid of railway and steam. Without the aid of some such auxiliaries, the whole of the valuable minerals in that extensive district would have been rendered entirely without value, by the expense of transit. Under all the circumstances of the case, the inhabitants of this rising port naturally view the occurrence of Tuesday with no small amount of gratification, inasmuch as it must prove a source of profit to them as well as to those who may be more immediately concerned in the success of that colliery. The High Sheriff of the county of Glamorgan (J. Martin, Esq.), John Jones, Esq.,— Price, Esq., and several other gentlemen, came down with the train. A band of music was in attendance. It appears that anthracite coal is rapidly increasing in demand; its uses are greater as its extensive capabilities are developed. One fact forcibly presents itself to notice in relation to economy, and which is the total absence of sulphur. By its existence in bituminous coal, and its liberation during combustion, we have one of the elements of sulphuric acid (oil of vitriol), which is so destructive to boilers; the purity therefore of anthracite coal cannot be an insignificant feature in its recommendation.—*Cambrian.*

STEAM BOATS AND ENGINES IN AMERICA.

(*From the Journal of the Franklin Institute.*)

The steam-boats in America, with the steam-engines used in the same, are of three entirely different plans of construction. Those upon the eastern waters, comprising the sea along the coast of Boston and Charleston, S. C., and all rivers emptying into the same, have condensing engines with large upright cylinders, and long strokes; the larger boats draw from five to seven feet water, and go with a speed of from ten to fifteen miles per hour. Upon the Hudson river, the distance from New York to Albany, 145 miles, is performed in eleven to twelve hours up stream, and in nine to ten hours down stream, including the stoppages at fifteen or twenty landing-places, where passengers come on board or leave the boat. I took a passage in the steam-boat, *North America*, on the 23d of November, 1838, from New York for Albany; as the river was already nearly half frozen over, a great deal of floating ice was coming down; the boat left New York at five o'clock in the evening, and arrived at Albany the following morning at seven o'clock; we made, therefore, including all stoppages, over ten miles per hour up stream. The length of the vessel is 200 feet, greatest width 26 feet; she has two decks, the lower of which, where the engines are, is about three feet above the level of the water; she has two separate cabins, the gentlemen's cabin, which is, at the same time, the dining room, and the ladies' cabin. We had 320 passengers on board, each of whom slept in a berth, and as sufficient room appeared still to remain, one may imagine how collossal this floating palace must be. Two steam-engines with 52 inch cylinders, move the paddle wheels of 22 feet in diameter. The pressure of the steam of this, as of most of the steam-boats upon the eastern waters, is about fifteen pounds per square inch, and the stroke eight to ten feet; the steam is generally cut off at one-third or one-half of the stroke, and operates by expansion. For a voyage of 145 miles, 25 to 30 cords (of 128 cubic feet) of soft wood are required. The *North America* draws, when loaded, six feet; but there are passenger boats upon other rivers in the east which draw, when loaded, only 24 to 30 inches of water, and move against strong currents.

The steam boats in the west, or upon the "western waters," are, throughout, very flat, and go, when loaded, generally five feet deep, some, however, only thirty to thirty-six inches. When the water in a river is only thirty inches deep, the steam-boat contains only the engine and fuel, and the cabins for the men, and flat boats loaded with goods are taken in tow. The passenger boats have two decks, the upper one is for the cabin passengers. The elegant boats contain a large splendidly furnished and ornamental saloon, used as the dining-room, and an adjoining saloon for ladies. The saloons are surrounded by small apartments (state rooms), each of which contains two berths, and round the state rooms is an open gallery, to which a door opens from each state room. Such a vessel offers to a European an imposing and entirely novel aspect. All steam-boats upon the western waters have high pressure engines, the pressure of steam being from 60 to 100 pounds per square inch. Often two engines are used in a boat, and then each engine propels one of the paddle-wheels. The cylinders are horizontal, the stroke is eight to ten feet, and the steam is generally cut off at five-eighths of the stroke, and then operates by expansion. The escaping steam is applied to heat the water pumped from the river, before it gets into the boiler.

The third kind of steam-boats is to be found upon the lakes in the north and north-west of the Union; they generally go much deeper than the former, are more strongly built, and are propelled partly by condensing and partly by high pressure steam-engines.

AMERICAN EXPERIENCE OF THE RAILWAY SYSTEM.

[From Second Report of the Directors of the New York and Erie Railroad Company, 3d Feb. 1841.]

On the Utica and Schenectady Railway, seventy-eight miles in length, the number of "through" passengers, in 1839, was 95,776, and of way passengers 86,823, total 182,599; equal to 125,102 through passengers; the fare through being three dollars, or a fraction short of four cents. per mile. It is understood that the passengers transported on that road are estimated at not more than one-fourth of the whole number that pass between Utica and Schenectady, on the canal aud otherwise, per annum.

The expenses of the year amounted to less than 30 per cent. of the receipts. The balance, after deducting all expenses, amounted to more than 15 per cent. on their capital. Had half of their capital been borrowed at 6 per cent., the earnings of the year, after paying the interest on the loan, would have divided 25 per cent. on the stock; or paid off the loan in four years of like receipts; or divided 10 per cent. per annum, and paid off the loan in six years.

The number of through passengers, as stated above, divided by the number of miles in the road, gives an average equal to 1,604 passengers per mile yearly, 134 per mile per month, and 31 per mile per week.

100,000 through on this road would give 224 passengers per mile yearly, 19 per mile per month, and 4½ per mile per week.

66,000 through would give 147 passengers per mile yearly, 12 per mile per month, and 3 per mile per week.

33,000 through would give 73 passengers per mile yearly, 6 per mile per month, and 1½ per mile per week.

On the Boston and Worcester road, forty-one miles in length, the average in 1839 would be 2,195 passengers per mile yearly, 183 per mile per month, and 42 per mile per week.

Ou the Boston and Lowell, twenty-six and a half miles in length, in 1838, 4,905 passengers per mile yearly, 409 per mile per month, and 94 per mile per week.

On the Camden and Amboy, sixty-one miles in length, in 1839, 2,984 passengers per mile yearly, 249 per mile per month, and 57 per mile per week.

Utica and Syracuse, fifty-three miles in length, in 1839, 2,302 passengers per mile yearly, 192 per mile per month, and 44 per mile per week.

The number of way passengers on the Utica and Schenectady Railway amounted, in 1839, to 86,823. The gross revenue derived from them was 87,979 dols. 57 cents, amounting to 1.01 dol. for each individual; and as the charge for a through passenger is three dollars, it is seen that the way passengers travelled on an average one third the length of the road. It may be assumed as nearly self-evident, that in a country occupied by a population distributed evenly over its surface, and having a uniformity of character and pursuits, the railways which traverse it will receive numbers of way passengers proportional to the lengths; that is, a straight road two hundred miles long will have twice as many way passengers as a road one hundred miles long. If we apply this principle to the case of the New York and Erie Railway, we may estimate the number of its way passengers from that on the Utica and Schenectady road, in the following manner, viz.:—

miles. miles.

78 : 446 : : 86,823 : 496,449 = number of way passengers on the New York and Erie Railway. If we suppose the distance travelled by the above number of persons to be the same in proportion as on the Utica and Schenectady Railway, the average journey for each will be one hundred and forty-eight miles. At four cents per mile the sum paid would be 5·92 dols., and the amount per annum received from all the way passengers would be 2,938,978·08 dols.

To illustrate this view of the subject still further, we will make a similar estimate from data furnished by the Utica and Syracuse Railway. The length of this work is fifty-three miles; the number of way passengers in 1839 was 55,802, who paid on an average seventy-three cents each, the price for a through passage being two dollars. By extending the calculations as above, we shall find that the number of way passengers on the New York and Erie Railway would, at the same rate, be 469,579, and the sum received from them 3,056,959 dols.

The amounts obtained in these calculations agree sufficiently to show that with regard to the railways cited, the rule that *the number of way passengers are as the lengths, holds good.*

The mean of the two results is about 3,000,000 dols., from which, if we were to deduct one-third for expenses, we would have a net receipt of 2,000,000 dols. on way passengers alone; equal to 22 per cent. on the capital; or if two-thirds of the cost of the work were defrayed from loans at 5½ per cent., the income on the remaining 3,000,000 dols. of stock would be 55 per cent. per annum. In other words, if the New York and Erie Railway shall receive as many way passengers in proportiou as the Utica and Schenectady, and Utica and Syracuse Railways, the net earnings might be more than sufficient to pay 5½ per cent. on 6,000,000 dols. of loans, and 50 per cent. on 3,000,000 dols. of stock, and this without taking into account the profits on through passengers, on freight, or on the transportation of the mail.

Nothing can illustrate more forcibly than this the advantages which long roads possess over short ones. The results obtained may seem extravagant, and it is not intended to be asserted that they will from the first be realised; but when it is remembered that the Utica and Schenectady railway has, to the north of it, a country which, as yet, yields very few passengers, and that on the south side it is in immediate contact with the Erie Canal, which, during seven months of the active portion of the year, divides with it the way business, and that the Utica and Syracuse Railway, having the same competition with the canal to sustain, has also the inconvenience of being constructed for nearly half its length across swamps which are at present uninhabitable, whereas the New York and Erie Railway is every where free from these disadvantages, it cannot be deemed unreasonable that we should expect to profit to a very considerable extent from the principle above set forth.

The Boston and Lowell road is one of the best in the country, and is worked as cheap, or cheaper than any other, in proportion to its length. But it is short, and notwithstanding its heavy business, both in passengers and tonnage, pays but about nine per cent. per annum on its cost.

Though the cost of roads on this side of the Atlantic is comparatively small, and their character as to routes, grades, curves, and superstructure, is quite various, it is believed that not more than two or three that are forty miles or more in length, and have been finished and in use twelve months, are unproductive; among which, the only one in New England or New York is that from Stonington to Providence. Their earnings vary from 6 to 15 per cent. Some shorter roads are known to be productive, but it is deemed quite safe and due to the subject, to state, that of the roads which are completed and in use, *those which are not productive are short ones.*

The report of the Western Railway Corporation of Massachusetts, dated March, 1840, states that the net income of the railways finished in that commonwealth averages over 8 per cent. per annum on their cost.

In 1839 the net income of the Utica and Schenectady road was 15 per cent.; of the Utica and Syracuse, 14 per cent.; of the Camden and Amboy, 13¼ per cent.

LOCOMOTIVE ENGINES IN AMERICA.

We extract the following from the report of the superintendent of motive power on the Philadelphia and Columbia Railroad, in which au engine built by Mr. Ross Winans, of Baltimore, is spoken of in the most flattering terms, which applies not only to the particular engine, but to the class of engines built by Mr. Winans.

"In addition to the different engines of the ordinary construction purchased by the undersigned, is one built by Ross Winans, of Baltimore, which, as well as others, was contracted for by a resolution of the board, previous to the date of my last report. The general principle upon which this engine is constructed is similar to the one which, by the order of my predecessor, had been placed on the road near a year before my appointment. It is, however, entirely different in its proportions.

"This engine was constructed by special orders, as an experiment in the use of anthracite coal as a fuel to generate steam; and, on trial, has met all my anticipations. It is very large and heavy, with more than double the power of any other machine on the road. It burns anthracite coal exclusively, and from the additional space of fire-box, obtained by its increased size, has advantages in the use of that article, which is not, and which cannot be possessed by any other plan of engine. It is intended exclusively for the transportation of heavy trains of burden cars. It will haul double the ordinary train, but owing to its great weight must be run very slowly over the road."

We have understood that this engine rests its entire weight on *four propelling* wheels, each wheel supporting about the same weight as each one of the *two propelling* wheels of the largest class six wheel engines on the Philadelphia and Columbia road. The engine last built by Mr. Winans is still more powerful than the one spoken of in the report; but having overcome the difficulty that has heretofore been deemed insurmountable, of placing eight wheels under his engine, and connecting the motive power with all of them, so as to get the adhesion of the entire weight, without having a weight on any one wheel which is oppressive to the road. The engine now furnished weighs 19·33 tons, when in running condition, and is mounted on eight propelling wheels, which divide the weight equally among them, putting 2·42 on each wheel. The passenger engines of Norris' construction, in such extensive use, weigh about 10 tons when in running condition; but as they have only two propelling wheels, the greatest adhesion which they can render available is that resulting from 6·70 tons resting on the driving wheels, which is but little more than one-third the adhesion obtained by Mr. Winans' eight-wheel engine, while the weight on each driving wheel of the Norris is 3·35 tons, nearly a ton more than the weight on each wheel of the eight-wheel engine. The power of every locomotive engine is limited by the greatest adhesion of its wheels on the rails; the adhesion is directly as the weight resting on the propelling wheels collectively. The greater the weight bearing on any one wheel the more destructive to the road. The greatest economy in transportation results from the use of the most powerful engines that can be employed consisteut with the strength and character of the road on which they are to run: hence the advantage of increasing the number of propelling wheels.—*Baltimore Clipper.*

THE COMMITTEE ON BANKING.

There would appear to be very little utility at present in adverting at all to the inquiry on banking affairs, recently before a committee of the House of Commons, which in all probability must fall with the present Parliament, and the affair, consequently, come to nothing. Still it may be useful again to revert to the opinion generally entertained by practical and impartial men, that the inquiry has left untouched that one great object for which it was instituted, viz., the means of preserving the equilibrium of the currency, and preventing those peri-

odical panics and pressures upon the money-market, which aro ruin to the trading interests, and a disgrace to our character aboad as a commercial country. This should specially be borne in mind, therefore, as the wish of our leading merchants and bankers, should the inquiry be resumed in the next session, that a more efficient committee should be appointed, and that their attention should bo directed particularly, if not almost exclusively, to this point. This is a subject which several correspondents are constantly urging upon us to press in the strongest manner possible upon the continued attention of the commercial world, as the time is rapidly passing away, and great danger exists that the legislature may be compelled to the continuance of the Bank charter in its present state, merely because they are not prepared with anything better to supply its place. All that was really done by the banking committee seems to amount to little more than this—that they have collected abundance of opinions from English, Irish, and Scotch country bankers, that the present system works well in their respective districts; and nothing can be more amusing, certainly, than the unanimity with which the representatives of these interests respectively, at one of their late meetings, concurred in a resolution to "co-operate cordially in resisting every attempt to interfere with a system of issue and circulation which has been found conducive to the public interest in their respective localities."

One suggestion by a correspondent relative to the pressures and panics adverted to is well worthy of consideration. These, he remarks, are always produced by the importation and exportation of bullion into and from London, to which place, though received and paid on account of the nation at large, its effects are confined. Bullion is neither imported nor exported from Scotland; and the question is, whether by the present system Scotland does not throw upon London that portion of pressure which is due to itself, but which, if equally divided among the whole kingdom, would never be felt; whence it would follow, that the whole of these pressures and panics are likely to be the result of some unnatural working of the system which centres upon London the whole demand, where it ought never to have come. The remedy should lie, consequently, in some plan for so combining the issues of the whole country in one, as to spread the demand for bullion equally, and the nature of the plan became of course the natural and legitimate object of the select committee on banking, who have brought forward little or no evidence bearing upon it.

Thus has the whole inquiry been stultified, and the natural conclusion is that it will either have to be recommenced, or undertaken in some other form, unless some Ministry should bring a bill into Parliament to settle the question without it.—*Times.*

EXCLUSION OF BRITISH PRODUCTIONS.

The preferential system of England is strongly infectious. In every country in the world the example of England is used as a justification for the creation of class interests, and for compelling the consumers to pay dearly for some necessary of life. A fresh instance of this may now bo seen in the United States.

The owners of the coal and iron mines of Pennsylvania, New Jersey, Virginia, and Maryland, are of opinion that "the policy which Great Britain has pursued, of affording protection, through the medium of a protective tariff, to her manufactures as well as her mineral and metallic productions, cannot be too strongly commended and recommended;" and accordingly they ask for a protective duty on foreign coal and iron, and a removal on the drawback ou railroad iron imported by companies. In Pennsylvania alone they assert there is sufficient coal and iron ore to meet the demand of the whole Union; but to enable the coal owners and iron masters of that state to supply the Union, the consumers must be made to pay dearly for these necessaries. The proprietors of the Pennsylvanian mines are full of patriotic warmth at the prospect of high prices and preferential duties. "With proper encouragement," they exclaim, "what a source of wealth would the good old commonwealth of Pennsylvania possess in her coal and iron mines! How steadily she would increase in riches and prosperity! How soon extricate herself from her present difficulties!" They forget to add that such blessings to their state would be purchased at the cost of the rest of the Union.

The American proprietors of coal and iron mines complain that their tariff imposes only the trifling duty of one dollar sixty-eight cents per ton on foreign coal, while Great Britain imposes a duty of upwards of seven dollars per ton on foreign coal; and that when a few years ago the importation of iron ore from New Jersey into this country became a profitable speculation, a prohibitive duty was laid on foreign iron ore imported into England.

The British duty on foreign coal is doubtless absurd, but as England is an exporting, and the United States an importing country, this complaint on the part of the Americans is captious and idle. The United States annually import about 200,000 tons of foreign coal; not from England, but from her dependency, Nova Scotia; and the disadvantage of the duty imposed on it is compensated by the facility of transport; the heavy expenses attendant on the inland navigation of the United States coal being greater than the duty. As foreign coal thus imported is actually sold cheaper than the home coal in the coal districts of Pennsylvania, the object of a preferential duty is very apparent.

We are unacquainted with the facts as to the imposition of a prohibitory duty on foreign iron ore; but we well know that England has nothing to fear from foreign competition in that article, and we are clearly of opinion that all metals, raw or smelted, ought to be imported as raw materials on payment of a mere *droit de balance*.

We record these facts as another proof, if one were needed, that if we persist in our preferential system, we shall be gradually excluded from all foreign markets. It is thus that "evil communications corrupt good manners."—*Journal of Commerce.*

DISPUTED VALIDITY OF A PATENT.

The Court of Chancery was engaged on Tuesday and Wednesday in hearing an appeal from the Master of the Rolls, in reference to Mr. Nickells's patent for covering cloth with caoutchouc. The patent was granted to Mr. Christopher Nickells for an improvement in machinery applicable to the covering of fibres to be used in the manufacture of braid and other fabrics. The Caoutchouc Company infringed the patent, and the patentee brought an action, but, before it was tried, the company discovered that the word "covering" in the specification had been erroneously written "recovering" in the enrolment; and they, therefore, determined to contest the validity of the patent. The Master of the Rolls, on the petition of Mr. Nickells, amended the enrolment, and the question now raised on the petition of appeal was, whether he had power to make such an order for the amendment of the record.

Mr. Wigram and Mr. Hindmarsh for the appeal, contended that there was no precedent warranting such an interference with a record.

Mr. Tinney, Mr. Dix, and Mr. Cory were heard in favor of the power exercised by tho Master of the Rolls.

The Lord Chancellor postponed his judgment.

BRITISH PATENTS.

PATENT NOT SPECIFIED LAST WEEK, WHEN DUE.

William Henry Bailey Webster, of Ipswich, surgeon, for *improvements in preparing skins and other animal matters, for the purpose of tanning, and in the manufacture of gelatine*, due May 25.

ENGLISH EXPIRED PATENTS.

William John Hobson Hood, of London, Lieut. R.N., for *improvements on pumps or machinery for raising or forcing water, chiefly applicable to ships*, May 26.

George Burges, of London, gent., for *improvements in the construction of wheeled carriages, and of wheels to be attached to the said carriages, or for other purposes*, May 26.

Thomas Clarke, of Leicestershire, carpet manufacturer, for *improvements in manufacturing carpets*, May 26.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 340.)

Francis Pope, of Wolverhampton, engineer, *improvements in detaching locomotive and other carriages*, May 24.—Claim.—The mode of constructing and applying apparatus herein described.

The following is the mode of applying this invention to a four-wheeled one-horse carriage, in order to release the horse from the same, in case of its running away.

The end of each shaft nearest the carriage is provided with two plates, forming a forked end to it; these plates carry a pin, which forms the axis of the shaft, and also the means of holding the shaft by the attaching apparatus. The attaching apparatus (of which there are two, one to each shaft) consists of two side plates affixed to the "futchells," their outer ends having a recess in them to receive the axis of the shaft; below this recess is the axis of a bent lever or tongue, which embraces the pin of the shaft, and holds it in the recess. The tongue is continually urged upwards by a spring, in order to release the pin of the shaft, but is kept from so doing by its outer end being under the leg of a catch; the catch is a vertical forked lever, moving on an axis at the lower end of its other leg; it is connected by a link with a spring, which has a constant tendency to draw it downwards, and thereby to keep the end of the tongue from rising; the tops of the two catches are connected to the ends of a bent bar.

The apparatus for drawing back the catches, in order to release the horse with the shafts, is attached to the dashing-board; it consists of a tube, through which a rod having a spring coiled round it passes, the upper end of the spring being fastened to the rod, and the lower end resting on a ledge at the bottom of the tube; this spring being provided in order to raise the rod after it has been forced down by the person who is driving. The lower end of the rod is forked, having a friction roller at the upper and lower parts of the forks, and between the forks, in contact with the friction rollers, the bent bar which connects the catches moves. On the rod near its upper end is a projecting knob, which rests on the upper edge of the tube when it is not desired to release the horse.

In order to release the horse with the shafts from the carriage, the person who is driving presses down the forked rod, drawing it slightly towards him, in order to remove the projecting knob from the edge of the tube, the forked rod being pressed down, draws back the upper ends of the catches, by means of the bent bar, and thus removes their legs from over the ends of the tongues, which, urged by their springs, rise upwards, and release the pins of the shafts from the recesses in the side plates; the horse, with the shafts, is now separated from the carriage.

Two railway carriages may be attached together by a similar apparatus.

John Haughton, M. A., of Liverpool, clerk, for *improvements in the means employed for preventing railway accidents resulting from one train overtaking another*, May 24.—All along the line of railway, on each side of it, and at distances of about two miles apart, are placed clocks; they are fixed on the top of

ast-iron hollow posts, placed opposite each other, and as near as convenient to the line of railway; the faces of the clocks are not parallel with the line, but are set diagonally, in order that the indications on the dials may be seen more easily by the drivers of approaching trains.

When the train approaches one of these clocks, the flanges of those wheels which are travelling on the outside rail, depress a horizontal bar placed just within the rail, and keep it depressed while the train is passing over it; this bar is attached to an apparatus fixed against the side of the rail, which is connected by means of connecting-rods and bell-crank levers with the works of the clock, so that on the horizontal bar being depressed, the hands of the clock are disconnected from the works, and are caused to assume a vertical position, as if it were 12 o'clock, by means of weights attached to their short ends; but as soon as the train has passed over the horizontal bar, it rises, and connects the works of the clock with the hands again, which now move round the dial in the usual way, commencing from the hour of twelve, and continue to do so until acted on in the same way by the next train.

By this means the driver of the next train will know how long it is since the preceding train has passed, by noticing what time has elapsed since the hands were at twelve; thus for instance, if the hands pointed to ½ past 2, it would show that the preceding train had passed by 2½ hours before.

At distances of a quarter of a mile beyond each clock post is placed a reservoir of condensed air provided with a valve; the action of the outside wheels of the train, on an apparatus similar to that above-named, opens the valve, and permits a portion of the condensed air to pass out of the reservoir into a pipe which branches in opposite directions, on one side to the nearest clock post, a quarter of a mile distant, and on the other side to the farthest clock post, one mile and three quarters distant. The condensed air proceeding through the pipes, forces up the pistons of two cylinders, one of which is connected by its piston-rod with a lever, working a round black disc on the lower part of the dial of the nearest clock; and the other is connected by its piston-rod with a lever, working a square black disc on the upper part of the dial of the farthest clock. Each clock is provided with two cylinders and pistons, connected with different air pipes, one cylinder being in connection with the lever of the round disc, and the other with the square disc.

The air-pipe does not terminate at the farthest of the two clock posts, but is continued for a quarter of a mile farther to the next reservoir of condensed air, where it terminates in a valve, opened by the same action as the valve of the adjoining reservoir by each passing train; this valve being opened, permits the air to escape, by which means the pistons being unsupported by the air, descend, and cause both the discs to disappear from the clock dials.

If the driver on approaching a clock finds no discs on the dial, he knows that the line is clear for at least 2¼ miles; but if he sees a round black disc on the lower part of the dial, he knows that the preceding train has passed the reservoir ¼ mile onward, but has not yet reached the escape valve of the air pipe connected with that disc, 2¼ miles onward, otherwise that disc would have disappeared. If he observes a square black disc on the upper part of the dial, he knows that the preceding train has not yet reached the next reservoir and escape valve, otherwise that disc would have disappeared, and there would have been a round black disc on the lower part of the dial.

In order to register the times at which the various trains have passed the various clocks along the line of railway, a cylinder is placed in each clock-case, the periphery of which is covered with paper, divided into 12 divisions, by lines running parallel to its axis; it is moved once round every 12 hours, by the works of the clock, and is likewise caused to move along horizontally, by means of a screw formed on one end of its axis, at a rate equal to 1-8th of its width in 24 hours. The 12 divisions of the paper are again subdivided into half-hours, quarters, and minutes. The registering of the time is effected by means of a point, which makes a puncture in the paper, every time the hands of the clock are acted on by a passing train.

Claim first.—The mode of employing a time-keeper, suitably acted on by each passing train, to indicate the length of time which has expired between the passing of one train and the coming up of another train; also, combined therewith, the using of apparatus to indicate whether the preceding train has passed certain distant points; and further, the combining therewith, apparstus to register the time of each train passing.

Claim second.—The mode of working discs or other similar instruments, as signals or indicators on railways, by condensed air, as above described.

Claim third.—The mode of registering the times of passing trains on railways, whether in combination with time-keepers used for the purposes above described, or otherwise.

JUNIUS SMITH, of Fen-court, Fenchurch-street, London, gent., for *certain improvements in furnaces*, (being a communication), May 25.—These improvements consist in a mode of supplying heated atmospheric air to furnaces of every description by a new form of revolving blower, mounted in a double box or case, being made with arms, formed either to carry common straight fans, curved fans, or fans set at a tangent to the centre air-opening of the blower; but any other form of fans may be used; the ends of the fans are embraced by metal discs or plate rings.

The blower draws in the air through openings in the centre of the blower-boxes, and forces it into the ash-pit, which is closed air-tight, during which action of the blower the air becomes mixed with and heated by the heat, that would otherwise escape with the unconsumed combustible gases produced by the combustion of the fuel; but which heat and gases are not permitted to escape by the chimney, but are retained in a receptacle between the usual point of escape and the top or back of the blower-box, and being received from the same by the blower, are returned into the fire through the closed ash-pit, the combustion of the fuel and returned gases being maintained by the fresh air supplied through the centres of the blower-boxes.

The heavy and incombustible gases descend by their own gravity into a receptacle in the outer box beneath the blower, where their gravity, aided by the general compression within the furnace, forces them through the interstices of a bed of sand or gravel, into a chamber below, from which they may be carried off by a pipe.

THOMAS BARRATT, of Somerset, paper-maker, for *improvements in the manufacture of paper*, May 25.—Claim first.—The mode of drying paper, by applying streams of air to the surfaces as the paper is being dried by steam cylinders, whether in the state of "engine size or water leaf," or after sizing, as herein described.

Above and below the usual steam-drying cylinders is placed a pipe, provided with a number of outlets, through which a thin wide stream of air is caused to sweep over the paper as it passes round the cylinders in the state of "engine size or watsr leaf."

Claim second.—The application of currents of air to the surface of the paper after sizing, in order to cool the size, as the paper passes to the steam-drying cylinders.

The paper, after passing through the sizing apparatus, proceeds over an open reel, having a fan within it, to which a slow rotary motion is given, so as to slightly fan the paper as it passes round with the reel; the paper then passes round the drying cylinders, and from thence through a series of rollers, by which it is glazed, being acted upon by streams of air in the way above mentioned, as it passes round the drying cylinders and between the rollers.

CHARLES GRELLET, of No. 49, Hatton-garden, merchant, for *new modes of treating potatoes, in order to their being converted into various articles of food, and new apparatus for drying, applicable to that and other purposes* (being a communication), May 25.—This invention consists in new modes of tresting potatoes, so as to fit them for making bread, biscuits, snd pastry.

The products of potatoes treated under this invention are the feculent parts of potatoes, and the paste of boiled potatoes.

The feculent parts of potatoes are first prepared in a wet state, which the patentee calls "green dextrine," and then dried by means of a drying apparatus, hereafter described.

The paste of potatoes is prepared in four ways:—Firstly, the skins of the potatoes are pared off by the machine hereafter described, and the potatoes sre then boiled and reduced to a paste.

Secondly.—The raw potatoes, with the skins removed, are boiled, dried, and reduced into a state of flour.

Thirdly.—The pulp of the potatoes deprived of the feculent parts is made into a moist paste.

Fourthly.—The pulp of the potatoes deprived of tho feculent parts, is boiled, dried, and reduced to a state of meal.

The machine for removing the skins of the potatoes consists of a large vessel for containing water, the bottom of which is of an inclined form, having an opening through which the deposit of pulp is withdrawn; in this vessel a cylinder revolves, its inside being covered with sheets of iron, having raised surfaces which act as graters; there are likewise several series of projections attached to the inside of this cylinder, which press against the potatoes and remove the peel or skin. In the same shaft within this cylinder, another cylinder is fastened, furnished on its periphery with several rows of brushes. The pulp is thrown out of the outer cylinder through an opening at one end of it on to an inclined plane, by which it is conveyed into a vessel placed ready to receive it.

The drying apparstus consists of a stove or furnace for heating air, from which the heated air is conveyed through a tube into a chamber containing lime; the lime is placed on a series of partitions one above another, which occupy the interior of the chamber, there being openings at the alternate ends of those partitions, so as to permit the air to pass along over the surfaces of the lime, in order to abstract all its moisture, before it goes into the chamber containing the substance to be dried. The heated air is admitted into the drying chamber by three sliding valves, and after it has become charged with the moisture of the matters that have been dried, is drawn off by a rotary fan placed at the top of an exhaustion chimney.

The mill for grinding the products of potatoes is composed of two vertical mill-stones, by which the products are ground; from thence they fall into a bolting cloth, through which the fine farina passes; but the larger particles are raised to the upper end of the cloth by a screw, and pass into two horizontal mills, where they are further ground. From thence they pass through hollow metal columns (provided with inclined shelves for dividing the flour), which support the mills, into a suitable vessel placed below them, from whence they are moved on by an endless screw, turning in a double cylinder into a box, in which a pulley revolves; round this pulley, and over another pulley placed in the drying chamber, an endless band passes, provided with metal cups, by which the flour is raised into the drying chamber. The double cylinder in which the endless screw turns is of zinc; the space between the inner and outer cylinders being occupied by flannel, and kept well supplied with cold water, so as to cool the flour in its passage through the double cylinder.

HENRY CHARLES DAUBENY, Esq., late of Windsor, Berks, but at present residing at Boulogne-sur-mer, France, for *a certain invention or improvement in the making and forming of paddle-wheels, for the use of vessels propelled in the water by steam or other power, and applicable to propel vessels and mills*, May 25.—The paddle-wheel consists of a box or centre, in which are placed one end of the spindles or axes on which the floats are fixed, the other ends of the spindles working in the circumference of the

paddle-wheel. On the spindles, near those ends that turn in the box, are short levers, working against a traverse whilst in the water, by which means the floats on entering the water are made to turn, and expose their broad surfaces to it. On leaving the water, another traverse catches either the float itself, or another short lever affixed to the spindle, and turns the float partly round, so as to present its edge to the water, keeping it in that position until it again enters the same; by this means the amount of power requisite for raising the "back water" will be saved.

The paddle-wheels are each provided with an escapement, in order to relieve them from the force of heavy seas.

The escapement consists of two or more cogs (turning on pivots), let into the box of the paddle-wheel, and traversing round with it, in a groove cut for this purpose in the "flanch or carrier" of the paddle-wheel, fixed on the end of the main shaft; this groove is provided with bridges, which cause the cogs on passing over them to throw up their front ends, and thus present their hind ends, opposite to abutments or ends of short grooves, formed in the face of the carrier, which coming in contact with the hind ends of the cogs turn the paddle-wheel round.

If the wheel is struck by a heavy sea, the blow causes it to revolve faster than the carrier, and the cogs revolving with the wheel pass away from the abutments, and continue to pass away from before them, until the force of the sea being lessened, the wheel ceases to revolve faster than the carrier, and the abutments again come in contact with the ends of the cogs.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page* 341.)

JOHN CONDIE, manager of Blair Iron Works, Dalry, Ayr, for *improvements in applying springs to locomotive, and railway and other carriages*, May 27.—Claim.—The mode of applying springs to locomotive, and railway and other carriages, whereby the desired proportion of the weight having been caused to bear on the driving or other wheels, the uniform continuity of that proportion is effected, and the constant adhesion of the driving or centre wheels to the rails or road is promoted.

This invention is applied to locomotive-engines or carriages with six or more wheels.

The engine or carriage is suspended from four points of suspension, affixed to two projections at each side of the framing; these act as axes to four triangular levers, two at each side of the framing; one end of each of these levers is connected with the springs of the carriage, of which there are only two, one at each side; such springs being applied to the bearings of the driving wheels by two spring pins or bearing rods, and their elasticity is communicated to the other wheels by bearing rods from the other ends of the triangular levers, the motion of these levers being connected by a rod attached to the other ends of each pair.

The patentee shows several modifications of the above.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page* 342.)

ROBERT ROBERTS, of Bradford, Manchester, Lancashire, blacksmith, for *a new method or process of case-hardening iron*, May 25.—Claim.—The method or process of case-hardening iron, by coating, covering, or combining wrought iron with cast iron.

This invention consists in making the article of wrought iron (required to be case-hardened) red hot, and dipping it into cast iron in a state of fusion, turning it gently round in it, when the cast iron will completely case over it with any required thickness of cast metal, from 1-16th to ½ an inch The wrought iron article, immediately on being taken out of the cast metal, is immersed in cold water, on taking it out of which, it will be found to be perfectly case-hardened or steeled.

FREDERICK THEODORE PHILIPPI, of Belfield Hall, calico-printer, for *certain improvements in the art of printing cotton, silk, and other woven fabrics*, May 25.—The first part of this invention consists in improvements in composing the mordants used in dyeing printed fabrics.

Standard yellow.—To 3 lbs. of nitrate of lead, 3 lbs. of brown or white sugar of lead dissolved in one gallon of boiling water are added, and the mixture is thickened with calcined farina, or any other known thickening.

Blue.—A mixture is made of 30 gallons of water, 4 lbs. of ground indigo, 6 lbs. of copperas, 10 lbs. of powdered slacked lime; to 15 gallons of the clear liquor produced by this mixture, 2 quarts of liquid muriate of tin, at 120° of Twaddle's hydrometer are added, and the mixture filtered through flannel to a thick pulp; then to 3 quarts of this pulp is added 1 quart of gum water, 2 lbs. of calcined farina, and 4 oz. of muriate of tin in crystals.

Green.—5 lbs. of white sugar of lead are dissolved in 1 pint of acetic acid, in an earthen vessel placed in a hot water bath, and to this mixture, when cool, is added 4 quarts of the blue pulp before-mentioned, beat well up with two pounds and a half of calcined farina, and 4 oz. of muriate of tin in crystals.

Olive.—To 15 quarts of the standard yellow liquor before mentioned, mixed with 5 quarts of gum water, 1 quart of iron liquor at 24° Twaddle, is added, and the mixture thickened with calcined farina or any other known thickening.

Orange.—To 2 quarts of the standard yellow liquor, 1 quart of the standard red liquor (hereafter described) is added, and the mixture thickened with 2 lbs. of calcined farina.

Buff.—To 3½ quarts of the standard yellow liquor, 1 quart of the standard red liquor is added, and the mixture thickened with 3 lbs. of calcined farina.

Brown.—To 14 quarts of the buff liquor, 1 quart of iron liquor at 24° Twaddle is added, and the mixture thickened with calcined farina.

Drab.—8 quarts of the standard yellow liquor, 12 quarts of gum water, and 1 quart of iron liquor at 24° Twaddle, are mixed together, and thickened with calcined farina.

Standard red.—To 4 lbs. of alum, dissolved in 1 gallon of boiling water, 2½ lbs. of white sugar of lead and 2½ lbs. of brown sugar of lead are added, and the mixture thickened with calcined farina.

Strong or deep red.—A mixture is made of 3½ lbs. of alum, dissolved in 1 gallon of boiling water, 1½ lbs. of brown sugar of lead, and 1½ lbs. of white sugar of lead; to a quart of this mixture, 6 oz. of calcined farina is added, and when cool a further addition is made of an ounce and a half of muriate of tin in crystals.

Pale red or pink.—To 8 lbs. of alum, dissolved in 2 gallons of boiling water, 3 lbs. of carbonate of soda, and 2 lbs. of white or brown sugar of lead, are added; to one quart of this mixture three quarts of gum water are added.

Black.—To 1½ quarts of vinegar, 1 quart of iron liquor, at 24° Twaddle, is added, and the mixture thickened with 1½ lbs. of flour, starch, or calcined farina.

Purple or lilac.—1 quart of iron liquor, at 24° Twaddle, 6 quarts of vinegar, and 10 quarts of water, are mixed together, and thickened with flour, starch, or calcined farina.

Chocolate.—The mordant now commonly used for this color will answer.

The second part of this invention consists in a mode of raising or fixing these colors in the printed pieces.

The patentee dissolves in a cistern, or other suitable vessel, 100 lbs. of carbonate of soda (or any other carbonated alkali) in warm water, adding the water till the mixture stands at about 18° Twaddle; it is then allowed to cool; after which 150 lbs. of cow-dung are mixed with it, and the mixture is allowed to stand for 24 hours before using it. Or a mixture is made of 50 lbs. of carbonate of soda, dissolved in the same quantity of warm water as the above, from 20 to 25 lbs. of bi-carbonate of soda, and 50 lbs. of cow-dung. Any other liquid or soluble substance, containing a sufficient quantity of ammonia, will answer the purpose in place of cow-dung.

The raising or fixing process is performed by passing the printed pieces through either of the above mixtures.

HENRY WALKER WOOD, of Chester-square, Middlesex, gent., for *an improvement in producing an uneven surface in wood and other substances*, May 25.—Claim.—The herein-described new combination of means or mode of producing any uneven surface, object, or figure, upon wood or other combustible substance, by repeated contact with hot moulds or dies, operating against the wood or other combustible substance in the manner herein described.

A matrix is formed of the object to be produced, and from this a mould or reverse model of the object is cast in hard metal that will stand fire. The mould is made red hot, and placed in a press, and the wood or other substance on which the object is to be formed is placed upon it; the follower is then brought quickly down, and the wood subjected to a considerable pressure, by which means those parts which are required to be removed will be burnt away, and those parts which are to form the figure will be untouched.

The article on being removed from the press is immediately thrown into a vessel filled with water or other liquid, and afterwards cleaned by scraping or brushing away the burnt parts.

NATHANIEL BATHO, of Manchester, Lancaster, engineer, for *certain improvements in machinery, tools, or apparatus, for planing, turning, boring, or cutting metals and other substances*, May 25.—This invention consists:—Firstly, of an improvement in the planing machine.

Secondly.—Of improvements in the lathe, slide-rest, and slotting apparatus.

Thirdly.—Of improvements in the screwing engine for screwing bolts.

Fourthly.—Of improvements in the drilling and boring machine.

Lastly.—Of apparatus for squaring nuts, and grooving screw-laps, &c.

The improvement in the planing machine consists in forming the tool with two cutting-edges.

The improvement in the lathe consists in placing the centres or spindles of the headstocks as near as possible to the back of the lathe-bed, and bringing the gearing to the front, thereby giving the tool a much more solid foundation when turning large diameters.

The improvement in the slide-rest consists in a motion for working the carriage or saddle on which the slide-rest or cutting-tool is fixed.

Upon the under side of the tool-carriage is fixed a box with two ears, which contains a nut working upon a screw; this screw has a spur-wheel cast upon it, which gears into another spur-wheel attached to a counter-shaft; upon this shaft is an askew spur-wheel, gearing into another askew spur-wheel, fixed upon a cross handle-shaft, which shaft may be turned by hand or power.

Another improvement in lathes consists in providing two tool-boxes or carriers, with slide motions at the back and front of the carriage, in order to cut screws, or slide backwards and forwards.

A further improvement in lathes consists in a slotting apparatus, to be attached to the "following headstock."

In connection with the headstock is a large bevel wheel, fixed upon the end of a shaft that works underneath the barrel of the headstock, and into this wheel a bevel pinion works, attached to the end of a shaft, upon which are fixed the fast and loose pulleys, by which motion is communicated to the apparatus, and a spur pinion that takes into another spur pinion keyed upon the end of a screw inside the following headstock; which last pinion answers for a fly-wheel when the apparatus is used for turning purposes.

When the machine is required for slotting purposes, a face-plate is fixed upon the end of the first-named shaft, the large bevel wheel acting as a

ace-plate upon the reverse end; these face-plates are each provided with a dove-tail groove and slide, in which crank-pins are fixed, being adjustable in the grooves. To these pins are attached connecting rods, which being fastened at their other ends to the hollow spindle or bar of the headstock, will impart to it a horizontal reciprocating motion, so that if a cutting-tool is attached to the extremity of this bar, all the ordinary work of a slotting or morticing machine may be performed.

The spindle of the fast headstock should also be hollow, to receive the end of the cutting-bar when the tool has completed its cut.

The improvements in the screwing-engine for screwing bolts, consists of apparatus for moving the cutting dies to and from the bolt or work to be screwed.

The back of each die is furnished with a dove-tail or square piece, sliding in a corresponding groove in the die-plate, and to each die is attached a right and left handed screw, turning in nuts fast upon the die-plate; upon the outer end of each screw is a pinion taking into a corresponding pinion fixed on a shaft that runs parallel with the die-plate, so that by turniug this shaft the dies will advance or recede.

The improvements in the drilling and boring machine are as follows:—Upon the driving shaft is keyed a worm-wheel, taking into a worm upon the foot of an upright shaft, upon the upper end of which is a similar worm, gearing into a worm-wheel upon a horizontal shaft, on the other end of which is a pinion, working into a rack attached to the spindle that carries the drill or boring bar.

The last part of this invention consists of a simple piece of mechanism for squaring nuts, to be applied to the single or compound slide-rest of a lathe.

Upon the slide-rest are screwed two sockets or standards, supporting adjustable carriers, in which a spindle is mounted for the purpose of holding the row of nuts to be squared by the rotation of the cutting tool which is fixed upon the lathe spindle.

A similar apparatus is employed for grooving screw-taps, &c., the cutting tool being suitably formed for grooving.

Oliver Louis Reynolds, of King-street, Cheapside, London, merchant, for *certain improvements in machinery for producing stocking fabric or frame-work knitting* (being a communication), May 25.—This invention consists in new arrangements of the working parts of a machine for producing stocking fabric or frame-work knitting, designed principally for the purpose of enabling the machinery to be worked by rotary power.

In front of the machine is a mitre-wheel, mounted upon a bracket fastened to the lower part of the framing, and turned by gearing from the main shaft; upon the face of this mitre-wheel there is a grooved ring or pulley, carrying a band, which passing over tension pulleys is attached to a sliding thread conductor, the ends of the band being made fast to the first-named pulley. The thread conductor slides upon a horizontal bar fixed to the front of the frame-work, and carries with it the bobbin upon which the thread is wound to feed the machine, the thread passing from the bobbin through a tubular conductor to the needles.

The horizontal bar to which the needles are affixed forms part of a vertical rocking frame or lathe, vibrating upon a shaft, which has its bearings in adjustable arms, hanging upon a back shaft fixed to the end frames or standards.

The sinkers (one to each needle) are formed at the ends of levers, turning upon a horizontal rod fixed in the moving sinker-frame, which hangs upon pivots set in the end standards.

The presser-bar is attached by arms, pivots, and brackets, at each end, to the lathe, and receives motion by means of connecting-rods from cams on the main shaft.

The slur-cock by which the sinkers are depressed slides upon a horizontal bar fixed in a bridge rising up from the sinker-frame. The traversing of the slur-cock is effected by a cord, the ends of which are made fast to two large pulleys, turning loosely upon the main shaft, being alternately locked to the same by means of clutches.

Edward Henshall, of Huddersfield, Yorkshire, carpet manufacturer and merchant, for *certain improvements in making, manufacturing, or producing carpets or hearth-rugs*, May 26.—The first part of this invention consists in an apparatus for winding two, three, or more threads, side by side, upon one bobbin, from separate hanks, thus preparing the threads for two or three thread warp, before it is placed in the loom for weaving.

The apparatus consists of a slight frame, the upper part of which supports the reels containing the hanks of yarn, the lower part of the framing supports the driving-shaft, upon which a series of wooden drums are mounted, revolving with it, and driving by friction of contact the bobbins on which the threads are being wound.

The yarns are taken separately from the hanks, and two, three, or more threads, passed through the eyes of a stationary guide-rail, thence through the eyes of a traversing guide-rail, and are then wound upon one of the bobbins side by side; so that the two, three, or more threads will readily unwind from the bobbins at the same speed, and thus always preserve a uniformity of length and tension. The traversing guide-rail is traversed to and fro, in order to bring the yarn evenly upon the surfaces of the bobbins, by means of a lever, worked by a heart or eccentric motion connected with the other end of the driving-shaft.

The second part consists in an improved construction of apparatus for printing or stamping spots, squares, or stripes, in different colors, across a number of yarns or threads.

Any number of bobbins containing the yarns are placed upon spindles, mounted in a framing at one end of the machine; the yarns are passed between friction guide-rollers, and one, two, or more threads are drawn through each space of a slay or reel; 10 or 20 of such threads or collections of threads are passed through the reed side by side, and form a band. A space of the same width as the band of yarns is then left in the reed, and then another band of yarns, and so on alternately, until the reed is filled; the ends of all the threads are confined in a nipper or clasp, and drawn tightly across the printing or stamping table. The operation of ordinary block printing or stamping is then performed.

After the length of threads lying upon the table has been printed, a nipper or clasp is closed in to them, at the end of the table nearest the bobbins, and is drawn across the table, thereby bringing a fresh length upon the same to be printed. The length which has been printed is now hung up above the machine to be partially dried, and is afterwards completely dried by passing over a heated cylinder, and thence over guide-rails (being separated by upright wires), and is wound in hanks upon a number of reels.

The third part consists of an arrangement of apparatus for weaving the warp throughout its whole length into a slight gauze-work or fabric, having weft threads put in at distances of about an inch asunder.

In front of a loom a creel of bobbins is placed, the warps of which are passed through the healds and reed, and attached to the warp beam; then at every inch of space a weft is thrown in, in order to convert the warp threads or yarn into a slight gauze-work, which is gradually taken upon the warp-beam. The warp-beam is now placed at one end of the printing table before mentioned, and the gauze-work or loose fabric is printed and finished ready for weaving.

The fourth part consists in weaving, in a simple loom, Brussels, or similar carpets, either in white or grey yarn, or any color intended as the ground of the pattern, and afterwards printing upon it any pattern or device, in the ordinary manner of block printing; the colored parts of which pattern are then raised, washed, and dried in the usual way, and the carpet distended, and the back of it stiffened with size or other suitable matter.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 7th of August.

Peter Fairbairn, of Leeds, engineer, and William Suttill, of Newcastle-upon-Tyne, flax-spinner, due July 26.

Nathaniel Lloyd, of Manchester, and Henry Rowbotham, of the same place, calico-printer, due July 26.

Nathan Waddington, of Hulme, Lancaster, engineer, due July 26.

Cornelius Alfred Jaquin, of Huggin-lane, due July 26.

John Bradford Furnival, of Street-Ashton, farmer, due July 26.

Richard Jenkyn, of Hoyle, Cornwall, mechanist, due July 26.

William Gall, of Beresford-terrace, Walworth, gent. due July 28.

William Currie Harrison, of Newland-street, Eaton-square, Pimlico, engineer, due July 28.

Joseph Pryor, of Wendron, Cornwall, builder, due July 28.

James Furnival, of Warrington, currier, due July 29.

Charles Schafhautl, M.D., of Swansea, Edward Oliver Manby, of Parliament-street, civil engineer, and John Manby, of the same place, civil engineer, due July 30.

James Mac Lellan, of Glasgow, manufacturer, due July 30.

Ezra Jenks Coates, of Broad-street, Cheapside, machinist, due July 30.

Henry Pape, of Great Portland-street, pianoforte-manufacturer, due August 1.

Charles Hood, of Earl-street, Blackfriars, iron-merchant, due August 1.

William Wilkinson Tailor, of Barrowfield House, Westham, Essex, gent., due August 1.

Dominie Frick Albert, LL.D., of Cadeshead, Manchester, due August 1.

FOREIGN INTELLIGENCE.

FRANCE.

FLAX-SPINNING.

The French spinners are attempting to vie with the English in the spinning of linen thread, which now forms an important branch of the English exports to France. The *Memorial de Rouen* has the following notice of a flax-spinning manufactory, recently established in that city by M. Chesnée. "This establishment is highly interesting; though almost in its infancy, two thousand kilogrammes of flax are spun there weekly by means of fourteen hundred spindles, which produce a thread that will almost challenge comparison with the best English thread of the same description. M. Chesnée usually spins from Nos. 30 to 40 English, which is a good saleable quality; but there are two spinning machines at which he makes Nos. 80 and 100; these threads, which are the finest manufactured in France, are very fine. He also spins tow in consequence of success in the spinning of flax; he spins the threads either with hot or cold water, or dry, according to the quality required."

THE PHENIX AND BRITANNIA STEAMERS.

The appeal to the Cour Royale of Rouen against the decisions of the Tribunal of Commerce of Havre in the case of the *Phénix* and *Britannia* steamers, the hearing of which has occupied several days, was decided on Tuesday. The judgment of the Tribunal is confirmed in every point, except that the General Steam Navigation Company is decreed to

pay the dues on registering the judgment, from which it was relieved by the inferior court. The English Company, and Captain Stranack, are ordered to pay all the costs of the appeal.

The waters in the Seine have risen within the last few days rather suddenly, and assumed the yellow and turbid complexion of winter, though there has been very little rain at Paris for a considerable time. On Monday the level, by the scale at the Pont Royal, was at 1 metre 60 centimetres, making a rise of 80 centimetres (2 feet 7½ inches English).

SAVINGS BANKS.

M. Benjamin Delessert presented on the 27th ult. to the general assembly of the administrators of the savings bank of Paris, of which he is chairman, the account of their operations during the year 1840. It results, from this document, that the savings banks received, in the course of that

year, in 223,454 instalments ..	31,437,439
In 786 transfer receipts	696,133.86
In interest and arrears of rents ..	2,663,972.86
Total of receipts	34,797,545.72
The reimbursements amounted to	33,798,484.23
Increase of the deposits over the reimbursements	999,061.49
Which, added to the sums vested in the treasury on 1st January, 1840,	69,357,276.29
Make a total amount, in the treasury, on 31st Dec. 1840, of	70,356,337.78

Besides these the savings banks possessed subscriptions to the amount of 62,835f. rent in the 5 per cent stocks. The investment rose to 2,500,000f. more than in 1839, but the reimbursements exceeded by 7,600,000f. those of that year, a fact which is to be ascribed to the uneasiness created by the *emeutes* and the combinations of the workmen, but particularly by the fears of war, after the conclusion of the treaty of the 15th July. The sums deposited in the savings banks throughout the kingdom on the 30th of April last amounted to 207,956,861f., of which 74,537,337f. belonged to Paris, and 133,419,524 to the departments.

The *Moniteur* publishes a return of the imports into France during the first four months of 1841. The quantity of French colonial sugar imported in that interval amounted to 20,448,607 kilogrammes. and that of foreign sugar to 3,317,883. Coffee figures in the returns for 6,577,000 kilogrammes; cotton for 16,765,000; olive oil for 10,471,000; wool for 5,417,000; coal for 456,386,000; cast iron for 7,693,000; hemp and flax yarn for 4,147,426; and linen for 2,080,000.

A curious instance of the effect of an electric current was observed, a few days since, at Revigny, in the Jura. A man had taken refuge from a violent storm at the entrance of a cave in a rock, when he was struck by lightning, and killed. On examining his body, the buttons of his coat, which were a mixture of pewter, were found melted, each in one half of their extent, and a portion of the metal they had lost was discovered firmly adhering to the nails of the man's shoes.—*Paris paper.*

During a severe storm at Colmar, in the Haut Rhin, a few days since, the electric fluid struck a house, destroying, however, only a few tiles of the roof, and then entered an adjoining stable in which were two men. They were both knocked down, and one of them lost all consciousness for several instants. A horse was also struck, and for a minute appeared to be dead, but then recovered. A sentinel on duty near the spot was almost suffocated.

The *Courrier de Lyon*, says that an exhibition of manufactures is about to be opened in that town, which it is expected will be the means of giving a stimulus to manufacturing industry, especially to the silk trade. It is remarkable that such a project has not previously been put in execution, as many other cities in France of much less importance than Lyons have exhibitions of manufactures.

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

A further opening of the Great Western Railway to Chippenham, took place on Monday.

CHELTENHAM AND GREAT WESTERN.—The portion of the Cheltenham and Great Western Union Railway between Swindon and Cirencester was opened on Monday; but there was nothing like ceremony on the occasion. The first train started from Cirencester at a quarter past seven in the morning, on the arrival of the *Era* coach from Cheltenham. The morning was delightfully fine, and a very large concourse of spectators were assembled to witness the departure of the train, which arrived at its destination without the slightest accident, so admirably were the arrangements made. After staying at the Swindon station about ten minutes, and witnessing the arrival of a train from Chippenham, and a goods train from London, many of the passengers returned to Cirencester, having been absent about two hours and a half. The journey from Cirencester to London may now be made in about three hours and a half. The station at Cirencester is situated close to the town, at the bottom of the Tethbury Road, and presents a very pretty appearance.—*Bath Gazette.*

RAILWAYS REGULATION BILL.—The consideration of the Railways Regulation Bill of Mr. Labouchere, to which the inquiry of this committee had reference, has been again postponed till the 4th of June.

SAFETY IN RAILWAY TRAVELLING.—During the last fortnight, Mr. Pettitt's ingenious contrivance "The Railway Train Controller" has been in daily use upon the London and Birmingham line, the directors of which deserve much credit for the anxiety which they constantly evince to promote in every possible way the safety and accommodation of the public. Mr. Pettitt's invention, which is exceedingly simple and easily managed, supplies most effectually the means, which hitherto have been a *desideratum*, of enabling the guards of a train to communicate with the engine-driver while the train is in motion. The benefits which cannot fail to result from the general introduction of such an apparatus on railways are too obvious to require enumeration.—*Morning Post.*

RAILWAY TRAFFIC, &c.—The particulars of traffic upon the several railways in England and Scotland (29 in number) for the last week—that is to say, up to the date to which the different returns are calculated—is as follows:—The total amount received was in round numbers, £67,200, of which there was £20,200 for merchandise, and £47,000 for passengers, parcels, carriages, horses, and mails. The greatest receipts were by the following railways:—London and Birmingham, £16,335; South Western, £5,814; Grand Junction, £8,221; Birmingham and Gloucester, £1,351; Birmingham and Derby, £1,090; Great North of England, £1,171; Great Western, £7,623; Liverpool and Manchester, £4,502; Manchester and Leeds, £3,290; North Midland, £3,702; and Midland Counties, £2,603.

RAILWAY COMPENSATION CASE.—An inquisition was held on Monday at the Town-hall, Southwark, before Sir C. Marshall and the Recorder, under a precept from the London and Croydon Railway Company, to assess the amount to be paid to Benjamin Aynesworth, patten-maker, of the Broadway, St. Thomas's street, whose premises are required for the New Joint Station of the Brighton, Croydon, and Dover Railway Companies. The claimant's demand was £919 1s. 11d. Sir Wm. Follett and Mr. Austin appeared for the company; and Mr. Hill, Q.C., for the claimant. The case having been called on, Sir William informed the Court that the claimant had agreed to take £230 in full of all demands, and the verdict was taken accordingly, being one quarter of the amount originally claimed.

BRISTOL AND EXETER RAILWAY.—The *Sherborne Journal* of last week, alluding to the opening of the Bristol and Exeter Railway, says—we beg leave sincerely to congratulate the public of West Somerset on the immediate prospect of reaping those beneficial results to which the introduction of a railway into such a district must necessarily give rise, and we hail with the utmost satisfaction the success which awaits the enterprising and spirited exertions of the directors of the Bristol and Exeter Railway Company by the opening of their line to Bridgwater on Whit Monday. Such an event must be looked upon as forming an era in the history of this part of the country, where, it must be confessed, we have hitherto been content to remain very much behind the north of England in availing ourselves of the fruits of mechanical invention and discovery, as well as in point of social advancement and intelligence. The speedy communication which will now, by the powerful agency of steam, be opened up between the commercial city of Bristol and the rich agricultural districts of Somerset, must tend to the mutual benefit of parties residing in each locality, by creating a large increase of trade and profitable intercourse; while the traffic which this line and that of the Great Western Railway will eventually afford between the entire county and the metropolis and the north of England will constitute a most important addition to those numerous advantages which we already possess. We apprehend the journey to London will, ere long, be accomplished in somewhere about six hours. What a marvel would such a declaration be in the ears of our fathers, who were accustomed prudently to make their wills before setting out on such an adventure, which occupied them several days!

SOUTH-WESTERN RAILWAY.—The conduct of the directors of the railway in raising the fares, appears to cause great dissatisfaction, as it is observed, that after they had succeeded in stopping all the coaches (excepting one) between this town and London, they immediately adopted the course pursued by monopolists generally, of demanding exorbitant charges.—*Salisbury Journal.*

SALISBURY RAILWAY.—We understand that the South-Western Company are about forming a branch line to Salisbury; the point of junction to be at Bishopstoke, between Southampton and Winchester. The Great Western Railway Company will, it is said, secure for their line some of the traffic of South Wilts and the adjacent district, by forming a branch from Box, or the neighbourhood, through Warminster and Salisbury.

THE HULL AND SELBY RAILWAY INQUEST QUASHED BY LEGAL INFORMALITY.—In the Court of Queen's Bench on Saturday, decision was given in the case of the coroner's inquest which was held on the bodies of the three persons killed on the Hull and Selby Railway, in consequence of a large piece of cast-iron having fallen from one of the carriages on to the rails. The jury returned a verdict finding that these three persons were travelling in a carriage drawn by an engine called the Collingwood, and it happened that a large piece of cast-iron, having worn through a rope, fell upon the railway, by means whereof these three persons were forced to the ground, and thereby injured, so that they died, and that the carriage and engine were moving to the death. The inquisition further stated that the engine and carriage were the property of the Hull and Selby and the Leeds and Selby Railway Company. The jury levied a deodand of £500. There were three objections taken to the inquisition; first, that it was taken on all the three bodies together, instead of there being a separate inquisition on each. Secondly, that the deaths having been occasioned by the upsetting of a railway carriage, which was so upset by the piece of iron being in the way, the inquisition found that the carriage was moving to the death, but took no notice of the piece of iron; and thirdly, that the carriage which was found to be moving to the death was not correctly described as the property of any one, the name of the company alone not being a sufficient description. A *certiorari* had been obtained to bring

up this inquisition, and the sufficiency of it was now to be argued on a *concilium*.—The Attorney-General contended that the form of the inquisition was sufficient.—Sir W. Follett was heard on the other side, and insisted that the description of the ownership of the property moving to the death was insufficient. The Court thought that upon this objection alone the inquisition must be held to be insufficient. Unless the persons in whom the property of the thing moving to the death was vested were properly described, there could be no regular enforcement of the order of the inquisition. The rule for quashing this inquisition must be absolute.

FOREIGN RAILWAYS.

It is stated in the *Handelsblad* that the ex-King of Holland has offered to the Prussian Government to construct, at his own expense, the railroad from Berlin to Breslau, in Silesia, on condition of the Government guaranteeing to him a minimum interest of 4 per cent., on the capital expended, for 40 years; after which term the road to belong to the state. The expenses are calculated at 10 millions of thalers, or 37½ millions of francs. It is supposed the offer will be accepted.

The number of passengers conveyed by the Meudon and Versailles railroad, including the intermediate stations of Bellevue, Sèvres, Chaville, and Viroflay, during the last month, amounted to 134,752, and the receipts to 167,040 frs.

RAILWAY LITIGATION.

In the Court of Queen's Bench on Wednesday the cause of the Queen *v.* The Directors of the Manchester and Leeds Railway Company came on for hearing. A *mandamus* had issued to the defendants commanding them to reconstruct a bridge across a road, such bridge not having been constructed according to the provisions of the Act by which the company was formed. The defendants had made a return, and the case had gone down to trial. There were fifteen issues, and some of these were found for the prosecutor, and some for the defendants. Both parties were dissatisfied with the verdict, and both obtained rules to set aside the verdict, or to enter the findings on the various issues in a different manner. The verdict in substance amounting to a finding that the bridge was constructed of a width sufficient for the convenience of the public. One objection to this finding was, that as the bridge was on a different issue shown to have been constructed in a manner different from that described in the Act, this finding could not be supported, for that whether the new construction was or was not convenient to the public was not a question on which the jury could be allowed to exercise an opinion, the only point to be decided being whether the bridge was constructed according to the Act of Parliament.

Mr. Creswell, Sir W. Follett, Mr. Hildyard, and Mr. Tomlinson argued for the company; and the Attorney-General, Mr. Kelly, and Mr. Starkie for the prosecutor. The Court took time to consider the question.

ALLEGED STEAM-ENGINE NUISANCE.

In the Vice-Chancellor's Court, on Thursday, counsel were heard in the case of Shuttleworth *v.* Cocker, the object of which motion was to restrain by injunction a nuisance arising from a steam-engine and needle factory belonging to the defendant. The factory, which had existed for several years, was situate about 200 yards from the mansion-house of the plaintiff, and up to the year 1837 the works had been carried on by a small steam-engine of four or five-horse power, and consuming about two tons of coals per week. In 1838 a new engine was erected of more than 20-horse power, which consumed 11 tons of coal weekly, and increased the nuisance to such an extent that Colonel Thornhill, who was then the tenant of the mansion-house, was compelled to give it up. The house became untenanted until the plaintiff came of age, in the autumn of 1839, when he went with his two sisters to reside there. Not succeeding in obtaining any abatement of the nuisance by remonstrances with the defendant, the plaintiff commenced proceedings at law, and obtained the verdict of a jury, declaring that the noise, smoke, and dust created by the machinery formed a nuisance. The defendant then endeavored to diminish the nuisance by the use of certain fans for dispelling the stone dust and steel filings, and to convey the noxious substances into the river, by means of pipes; but all these experiments were alleged to have failed, and to have been attended with the additional evil of destroying all the trout in the river. The witnesses described the noise of the wind passing through the tubes to be like "a deep, grating, melancholy moan," which could be distinctly heard at a distance of from three to five miles. The defendant contended, notwithstanding the verdict of the jury, there never had been any nuisance; his affidavits also contradicted a great many of the statements on the part of the plaintiff; and he further contended that, at all events, since the improvements he had made, the inconveniences had so much diminished, that, as things now stood, there was really no substantial ground of complaint.

The Vice-Chancellor was of opinion that sufficient had been shown, at least with regard to the noise, to induce the Court to grant an injunction.

Some discussion then took place with reference to the terms of the order, and it was finally decided the injunction should be framed in such a manner as to restrain the defendant from using his steam-engine and grinding machine so as to occasion a nuisance and injury to the plaintiff.

TO CORRESPONDENTS.

Mr. Charles Golightly is particularly requested to call at our office. The specification is due on the 4th of July, and if not specified by that day the patent will be lost.

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 24 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes, containing the Nos. of every 6 months.

THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, JUNE 5, 1841.

Although it is altogether out of our province to interfere in party squabbles, we cannot see the real interests of the country sacrificed merely for party objects, without protesting against such a perversion of the administrative and legislative functions of the Government, and of the Parliament. Upwards of four months of the session have passed, and as far as the great manufacturing and trading interests of the nation are concerned, it would have been better if Parliament had not assembled. Subjects have, indeed, been thrown open for discussion that must ultimately lead to beneficial results; but the immediate effects of thus scattering abroad the elements of strife is to widen the breach between classes whose interests are intimately connected, to unsettle commercial arrangements, and to operate injuriously on all branches of trade and manufactures.

The spirit of party which pervades in the consideration of all important questions, is an almost insuperable bar to practical improvement; and until the time arrives when subjects will be viewed by their merits alone, rather than by their bearings on party and class interests, we cannot expect to see an enlightened system of legislation. It may, perhaps, be visionary to expect that party views will ever cease to actuate public men in the consideration of public questions; but we are sanguine enough to anticipate, that as the people become enlightened, and better acquainted with their true interests, their representatives in Parliament will respond to their increasing demands for improvements in the laws, and for a more generally beneficial and common-sense system of legislation than has been hitherto adopted.

We are in some degree confirmed in these hopes by the advances already made, when compared with former times. The influence of class interests in Parliament is considerably weakened, and even party objects are obliged to be concealed under the guise of the public good. The difference in the measures proposed by opposing parties is now, indeed, more in form than substance; and were it not that they are enlisted and retained by

points of honor on different sides, and entertain some difference of opinion on the theory of government, they might cordially combine to carry out most of the measures respecting which they now dispute.

To some desponding minds the present aspect of national affairs seems to discourage the hope of improvement. As the wealthier classes approximate in their political views and objects, the discontent of the great masses of society seems to increase. Their better organisation, the result perhaps of increasing knowledge, threatens a serious conflict, in which physical strength will be pitted against superior wealth, influence, and intelligence, and the existing system of society be overthrown. To those who entertain these apprehensions, the "march of mind" among the working classes becomes a subject of gloomy fear, instead of bright anticipation. We grant that the indications of popular feeling, and the increased sources of intelligence, require to be narrowly watched and carefully guided. We, however, rather dread that the physical force of the country should remain in its present imperfect state of enlightenment than that it should be raised higher in the scale, where it might take more enlarged views over the field of knowledge, and be able better to appreciate that its true interests are blended with those of its directors and employers. At the same time, it behoves those who by their wealth or superior attainments are placed among the upper classes of society,—more especially is it incumbent on the members of the legislature, to adjust their conduct and their measures to the growing intellect of the country.

The party fights which have lately occupied the time of the House of Commons, to the total exclusion of the business of the country, are calculated to lower the legislature in the estimation of the people, who now look for beneficial practical measures, and are sick of these never-ending struggles for place. As these opinions increase and strengthen, and when the demands for a more enlightened system of legislation are urged by an intelligent people, the legislature will be obliged to throw off the trammels which now keep them within a beaten track, and to consider the welfare of the public, not by examining past ages, but by regarding existing circumstances and their probable consequences.

We are not of those who look forward to Utopian prospects of universal happiness, for so long as human passions and feelings rebel against the voice of reason, it will be impossible by any system of legislation or by any form of society to remove misery from the lot of man, or to prevent injustice and injury. But if the extension of knowledge and civilisation, if improvements in the arts and manufactures, if increased facilities of intercourse and communication, which enlarge the capacities for enjoyment, add to the comforts and luxuries of life, and unite distant provinces and nations in one common bond of union—if these be admitted elements of happiness, they are now disseminating over the whole globe with a rapidity never before approached. The result cannot be otherwise than beneficial, though the time may be long before their advantages are fully and generally extended.

It will be seen from a decision in the Court of Queen's Bench, which is briefly reported in another column, that the coroner's inquest on the bodies of the three persons killed on the Hull and Selby railway, has shared the same fate as the other railway inquests are likely to meet. The validity of the inquest in the Hull and Selby case was disputed on several frivolous technical grounds, most of which were overruled, but on the objection of a want of propor description the Court decided that the verdict must be quashed. This accident, which was the forerunner of the other railway accidents which closely followed one another last autumn, and excited so strong a sensation through the country, was perhaps more than any other the result of negligence on the part of the company, and the litigious opposition made to the comparatively moderate amount of deodand levied by the jury does not speak favorably of the liberal spirit of the management. The feeling of the public was greatly roused at the time, nor do we think that the lapse of nine months will have altered their opinion that the deodand of £500 was a moderate fine for the culpable neglect exhibited.

NEW INVENTIONS.

RAILWAY AND OTHER SIGNALS.

The *Greenock Advertiser* publishes the following notice of a new railway signal, the invention of Mr. Rettie. We also subjoin a letter we have received from that gentleman, in which the nature of his signals is more particularly explained.

"A few days ago we were shown, by Mr. Rettie of Argyll-street, a signal lamp, invented by him, and which is intended to offer the ready means of averting danger by the collision of railway trains. As it is likely to be patented, we are not at liberty to specify in detail the peculiar merits of the invention, farther than that, by a very simple process, the light can be changed instantaneously from the usual appearance to crimson or green, as it may be wanted, to denote the degree of danger to an approaching train. It is so arranged that it may be used at the junction of one, two, three, or four lines, if required, and so easily understood that the most illiterate may be able to use it in two minutes, giving from one to twelve signals. Not only is it original in the signal department, but the improved burner and reflector, and the method of burning the smoke, secures a steady bright flame, during the most boisterous weather."

To the Editor of the "Inventors' Advocate."

Dear Sir,—I have this morning received your number, 29th of May, where you mention, under the New Inventions, Mr. Bain's contrivance of colored glass for ship signals in a kind of lantern, at the same time giving his plan of operation. As to Mr. B. being the original inventor, I should suppose he does not lay claim to that, as this is the first intimation which has appeared in your useful publication. However, to me it is no new idea; as far as 18 months, if not two years back, I have been engaged in devising the best plans or code of signals for preventing those too frequent and heart-rending catastrophes, in the dead of the night,—collisions at sea, either in sailing vessels or steamers; and having the same now fully matured, the manner of giving the signals, and the *simplicity* with which the same can be accomplished, with *certainty* of *effect*, and I may say almost under any excitement, these signals can be given, either telling the vessel, or showing the course she is taking, or in distress, or requiring assistance, that even the most ignorant can and may understand it if they give it five minutes reflection. I am sorry, however, to say, and though reluctant to do it, as I conceive that all inventors deserve encouragement, and I for one would be sorry to damp the ardor or spirits of Mr. B. by any thing that the truth and my own conduct tempts me to utter,—I fear, however, Mr. B. from his plan has never been at sea, or he must at once have seen the fallacy of trusting the regulating power for shifting his colored glasses to so changeable and uncertain a concern as the alterations of the helm, as he might as well trust his signals to the hoisting and lowering of the sails as to the rudder, which is impelled, driven and altered by every heave of the sea or the wind upon the vessel. So uncertain and changeable would his colors appear to those on board the vessel approaching, they could never divine which course they intended to steer; and in this case I feel convinced "ignorance" of Mr. B's. signals would be "bliss," from the uncertainty and throwing them off their guard; they had better trust their usual foresight than be led by such an *ignis fatuus* as the dancing colors of Mr. B. That the colors are applicable for the purpose under certain arrangements is quite evident and practicable beyond doubt; but Mr. B's. plan, I am sorry to say it, is utterly impossible to be effected with any certainty, and this only convinces me the more, that however beautiful things may appear in theory, practice alone is the proper, nay, the sure test of their worth.

At a future time I shall be happy to send you a complete description of this new-invented signal lamp, and also the code of signals. It is free from complexity or uncertainty of action, and may be applied to the smallest or the largest vessel of her Majesty's Navy with equal success; and should the Admiralty once approve, and give the order, the whole British shipping interests, as well as the other nations of the earth, will speedily adopt a plan that gives safety to life and property, and be the means of preventing the fearful catastrophes that so often occur in our greatly-increasing and extending steam communication, as well as sailing vessels, railways, &c., throughout the British Empire; and should I be the humble instrument in adding to such a philanthropic consummation, I will be amply repaid in my occupation.

I am, dear Sir, yours,

Glasgow Boat Foundry, R. Rettie.
31st May, 1840.

A FISH-TAIL PROPELLER.

We have this week been shown a plan for propelling steam ships in which the action of fishes' tails in moving through the water is imitated. The inventor is Mr. Henry Silvester, who some time since had a working model of his apparatus constructed, which, to the extent of its power, proved the practical applicability and efficiency of his plan. Mr. Silvester claims to be the first who invented the plan of fixing propellers in the stern-posts of ships, which has since been adopted in the cases of other propelling apparatus. In his plan there are two propellers, each of which describes a semi-circle under the stern part of the ship, and as they are constantly under water there is no surge or commotion on the surface as with paddle-wheels. The propelling vanes are worked by a rack and toothed wheel attached directly to the piston, so that the inventor estimates there will be a material saving of expense in the construction of the engines as well as a saving of one quarter of the power in the mode of bringing the propeller to act on the water.

NEW MANUFACTURE OF VELVET.

At the meeting of the Academy of Lyons, on the 18th ult., M. Seringe made a report, in the name of the committee appointed to examine the new process of M. Janin, for the manufacture of velvet. After making allusion to the manner in which this material has hitherto been manufactured, the report entered with considerable detail into the explanation of M. Janin's machine, by means of which two pieces are manufactured at once. Instead of half a metre, which is as much as a good workman usually manufactures in a day, he can by this plan weave more than

two metres. This important invention principally consists in a very simple regulator, which in the course of its operation distributes the requisite quantity of nap. With respect to the cutting, a knife placed in a groove separates the two pieces during the progress of the manufacture, by dividing the nap exactly in the middle. This method of cutting is very neatly executed, and by it all the freshness and brilliancy of coloring are preserved. There are certain parts of the mechanism which may be applied with advantage also in the manufacture of all kinds of stuff. The rapidity with which the two pieces of velvet are manufactured, makes a very considerable reduction in the price. For instance, instead of 4 frs. 45 c. for the manufacture of a metre, the expense is only 1 f. 45 c. The difference is still greater in making velvets of larger size, and it requires no more material for manufacturing by this process than the common one. The committee has presented a piece of cotton velvet to the Academy, which has been estimated by good judges at 12 frs. a metre, and which could be produced at 8 frs. This new invention, for which the Academy have awarded a medal, is of great importance to Lyons. Not only does it secure her superiority in the manufacture of this rich material, but it will bring velvet into more general use, in consequence of the quickness and facility with which it can be manufactured; and what is a singular fact in the history of invention, it will raise the wages of the workmen, who will from this time receive from 3 frs. 50 c. to 4 frs. a day, instead of from 2 frs. 25 c. to 50, which are the present wages. —We believe we are authorised to state that Messrs. Janin and Falsace have renounced for themselves and others the exclusive appropriation of their patent, a determination highly favorable to the prosperity of our manufactures.—*Courrier de Lyon.*

IRON ROPE.

M. Guillemin, engineer of Avesnes, has invented a new method of raising coal *cuffats*, from the bottom of shafts, by means of a line, formed of small iron plates jointed together, and forming a flat band, which supersedes the hempen band commonly used.—*Galignani's Messenger.*

SCIENTIFIC CORRESPONDENCE.

To the Editor of the "Inventors' Advocate."

Sir,—I trust that my motive in again opposing you on another topic will not be misconstrued, but I cannot allow the opinions you have advanced in your last number, on "The Economy of High-pressure Steam Engines," to be so extensively circulated as they are in your journal, without endeavoring to correct what I conceive to be an important error; in this age of rivalry and enterprise they may lead to serious losses and disappointments.

From the experience I have had, both theoretically and practically, in steam and steam machinery, I will at once premise that in the experiments you have adduced in support of your data, some important elements must have been overlooked; what these are, I cannot precisely say, unless I were to see the experiment performed; there is one, however, which you have not stated, and which is very essential, viz., the *volume* of the steam which was so augmented in pressure by the respective increments of temperature. You must be aware, or at least allow, that the same quantity of heat or of fuel consumed, which will increase the pressure of one cubic foot of steam in contact with water to any assigned limits, will not so increase two, or any other number of cubic feet; it is not sufficient in these experiments to ascertain merely the amount of heat imparted from each source, but also the bulk of water upon which that heat operates, and the *space* occupied by the steam at the respective temperatures and pressures.

From my own experiments and those of others, many of which I have repeated, I do maintain that equal *weights* of steam at all pressures contain equal amounts of caloric, and that this law holds good for every gas, as well as every vapor above the boiling point of the liquid from which that vapor was generated.

I will now propose a subject for you to reflect upon, and which ought to have your mature deliberation previous to your continuing this subject; it is this—one cubic foot of steam at the pressure of the atmosphere holds, according to your own admission, 990° of latent and 180° of sensible heat above the freezing point, making the sum of 1,170°; two cubic feet will consequently hold twice 1,170, or 2,340°. Now, if these two cubic feet are compressed into one,—supposing that no heat was absorbed by the vessel, or lost by radiation,—what would be the result? Why this, that the pressure would be doubled; that is, be equal to 15 lbs.; and also, that from each cubic foot there would be abstracted 19° of its latent heat, which, being added to the sensible heat, would make the latter 250° instead of 212°. Now this augmentation of sensible heat consequent on condensation, is necessary to the existence of steam at that pressure, and will be all that is required to enable the steam to again expand to its original bulk; you will in this instance perceive that whether the same *weight* of steam occupies one or two cubic feet, it absolutely holds the same amount of caloric.

Let us now take the converse, and suppose, from your theory, that 38° of sensible heat is alone sufficient to add another cubic foot of steam to the one already formed at atmospheric pressure, and thereby producing a pressure of 15 lbs.; from what source, allow me to ask, is the heat to be derived,—and which is necessary to its very existence as steam at barometric pressure,—when it is cut off from all communication with the boiler, and expanded to two?

To support your hypothesis, you must either admit that two distinct cubic feet of steam at atmospheric pressure, when compressed into one, do not possess the same properties as one cubic foot of your steam brought to 15 lbs. pressure in the boiler, and that the compressing force being removed within the former will regain its original bulk, or the latter expand to two cubic feet; or, that they are precisely circumstanced. If the first proposition is admitted, you should advance some new law which will separate steam from that which governs every one of the permanent gases.

I am, Sir, your obedient servant,

Norwich, June 1, 1841. F. Ham.

[We feel much obliged to Mr. Ham for his vigilant and friendly censorship. We steadfastly maintain our opinions when we conceive they are well founded, and we are equally ready to acknowledge an error when convinced we are wrong —as we admit ourselves to be in the present instance. The note appended to the article in the first page of this day's journal, was written before we had been favored with Mr. Ham's communication.]

Society of Arts.—A meeting for the distribution of rewards, adjudged during the present session, took place in the society's rooms, John-street, Adelphi, on Tuesday. Amongst the company was Minakjee Chirokjee, who came from India to visit the institutions of this country. At one o'clock his Royal Highness the Duke of Sussex entered the room, after which the report was read by the secretary, and the rewards were then presented to the respective candidates by his Royal Highness, who accompanied each gift with some appropriate remark. In mechanics and other practical arts, prizes, varying from ten to two guineas, were distributed to eight individuals, five of whom were Spitalfields weavers; ten others received either the gold or the silver Isis medals. The thanks of the society were voted to several gentlemen for valuable gifts and communications. In the fine arts, four silver medals were voted to lady amateurs, and seventeen silver Isis and other medals to artists, amongst whom was Master George Landseer, aged nine years, for water-color drawings of birds and beasts from nature, the silver Isis medal. On a vote of thanks being passed to his Royal Highness, he said it gave him particular pleasure to observe so many useful inventions on the part of the working classes, who thereby showed that their time was spent in laudable efforts for advancing their own particular trade, and promoting the advantage of their fellow citizens.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(Contributed expressly to the Inventors' Advocate.)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING JUNE 7, 1841.

Monday	Entomological Society	8 P.M.
	British Architects	8 P.M.
	United Service Institution	9 P.M.
Tuesday	Medico-Chirurgical Society	8½ P.M.
	Civil Engineers	8 P.M.
	Meteorological Society	8 P.M.
	Zoological Society	8½ P.M.
	Royal Botanic Society	8 P.M.
Wednesday	Society of Arts.—Illustration	8 P.M.
	Medico-Botanical Society	8 P.M.
Thursday	Royal Society of Literature	4 P.M.
	Royal Society	8½ P.M.
	Antiquaries Society	8 P.M.
Friday	Astronomical Society	8 P.M.
	Royal Institution	8½ P.M.
Saturday	Mathematical Society	8 P.M.

ROYAL INSTITUTION.

May 28. Friday Evening Meeting.

Professor Owen delivered a lecture "On the Mode of examining Fossil Remains." At the commencement of the discourse it was stated, that had the facts presently to be noticed been brought before a philosophical audience 30 or 40 years ago in the form in which he was about to describe them, the lecturer would have been looked upon as some practiser in mythology, or some visionary zoologist, an inhabitant of Venus, or some other of the planets. The mode now adopted to arrive at the history of fossil remains is deduced principally from the consideration of anatomical details, as first explained by Cuvier. This naturalist was led to reason on the subject from the circumstance of having discovered the remains of the *Anoplotherium* in the gypsum formation of the neighbourhood of Paris. Some of the teeth were first found, afterwards the bones of the feet, and subsequently other portions of the skeleton, which enabled him to compare and verify the assertions deduced from the consideration of but two or three separate organs. From the arrangement of the enamel of the teeth Cuvier conjectured that the food on which the animal subsisted could be ascertained—thus in herbivorous animals the enamel is folded into the bone (dentine) of the tooth, the effect of which arrangement is to produce rough surfaces capable of grinding the food. He likewise arrived at the conclusion, that those animals possessed of but one articular surface on the bone of the foot, called the *Astragalus*, are possessed of from one to three toes; while those *Astragali* which present two articular surfaces have either had two or four toes attached. The only animals possessed of three digits to each foot are the Ruminants. After enumerating several other peculiarities of a secondary nature, he proceeded to describe some of the results obtained by the mode of analysis established by Cuvier and himself; and alluded to the reasoning which led him to the conclusion that the small portion of the bone of a head of an extinct animal (fossil) belonged to an ant-eater, of the gigantic size of an ox. Mr. Owen has also arrived at the conclusion, from the examination of teeth of the Batrachian order, that the English new red sand-stone and the German are identical. From studying a portion of the nasal bone of the Labyrinthodon, he concluded that this animal had ribs, and was therefore incapable of depositing its eggs in a mass, as is the case with frogs; but possessing ribs, it could have been able only to deposit them one at a time, as the lizards, &c. With regard to the distribution of fossil fish, they extend throughout the whole strata, but in no instance are they identical with recent species. One of the many beautiful and interesting generalisations made by Mr. Owen was, that below the chalk no fish had yet been found belonging to the *Ctenoid* order of M Agassiz—and every fish met with below the

magnesian limestone has been observed to have an unsymmetrical tail.

During the discourse the professor entered into various minute details of an anatomical character, and exhibited, at the conclusion of the lecture, many interesting structures of which he had spoken, under the microscope.

MICROSCOPICAL SOCIETY.

May 27. *Professor Owen, F.R.S., &c., President, in the Chair.*

A paper was read from Dr. Haro, being "Observations on the Production of Animal Infusoria." It has been long known that animal life is produced by the decomposition of animal or vegetable substances in water. In what manner the infusoria find their entrance into the fluid is a subject which has been for some time under consideration; some philosophers being of opinion that they are the products of spontaneous or equivocal generation, while others uphold the more plausible doctrine of *omne vivum ex ovo*. The latter theory is the more probable, as Infusoria are only to be met with in solutions in contact with the atmosphere in its ordinary state, and which is doubtless the vehicle for conveying eggs, &c.

In the experiments detailed by Dr. Haro, some curious theories were propounded, which if found, on reconsidering the subject, to be correct, may prove of great importance. He placed some flesh of a carnivorous bird with water in a vessel, and in another he macerated some parts of the flesh of the carp. After they had been in contact for some two or three days he examined the water with a microscope, and detected a number of molecules or ultimate particles of the flesh, which had become separated by the putrefactive process; very shortly afterwards life appeared in the fluid in the form of *monads* and *vibrios*; the last-mentioned infusoria obtained from the flesh of the bird arranged themselves in masses, and moved with considerable rapidity in proportion to the quantity of fluid in which they were placed. Their motions are instantly arrested by the addition of a drop of alcohol to the solution. The most curious fact noticed was, that after the water containing the infusoria had evaporated, the corpuscles, together with the animalcules, seemed to take either an *arborescent* form, or to arrange themselves in *cross-parallel bars*; and if they were again moistened with water, and examined, needle-shaped bodies appeared, without the slightest trace of voluntary motion. When in a dried state they had all the appearance of crystals of hydrochlorate of ammonia, &c.

Dr. Haro has found that albumen, subjected to decomposition in water, produces generally but *monads*, while fibrine gives origin to *vibrios*. Should this prove on repetition to be the case, it will be an additional test for these substances. Raspail has detailed nearly all of the above facts; he is inclined to the opinion that there exists in animals as in plants corpuscles endowed with electrical action, which enables them to move about and appear like masses of animals endowed with life. The author concluded by stating that these facts, together with others included in the memoir, prove, *first*, that the air is not in all cases the vehicle of the germs of true animalcules; *secondly*, that substances in a state of putrefaction only contain them when in contact with other substances in which they already exist, and that they are not developed except under certain circumstances; *thirdly*, that decomposition of organic matter only gives birth to rudimentary species, vibrios and monads, which, generally speaking, are not animals; and that if true animalcules can be observed in them, these can only be regarded as larvæ deposited in their substance by minute insects flying in the air, such as the vibrios of vinegar and paste; that, consequently, there is not here any spontaneous generation, properly so called; finally, that all other particles are rudimentary crystalline atoms, which are detached from organised bodies under decomposition, and are put in motion by electrical forces, until the aggregation of the molecules constitutes them solid bodies, under the form of the crystals which the substance affects to which they belong.

Professor Owen said that the question involved the animality of monads and vibrios, and that it bore on the question of spontaneous generation as restricted to entozoa and animalculæ. In his opinion the author of the paper was behind the present state of science, and appears to be unacquainted with the recent remarks of Ehrenberg on *monades*, by whom their compound organs and internal structure had been ably detailed. He was also of opinion that it would be well to follow up the subject, and give more in detail the results, as Dr. Haro neither mentions the temperature kept up during the action of the water on the flesh, nor whether distilled or common water had been used. In the latter instance, if such had been employed, it would at once account for the crystallisation above noticed, and which in the act might have entangled the animalcules; nor did he allude to the magnifying power he made use of—points of the greatest moment to the scientific inquirer. Neither, in Mr. Owen's opinion, could he have been acquainted with the experiments of Professor Schultz, of Berlin, as regards equivocal or spontaneous generation, a brief and lucid description of which the Professor gave to the meeting; the abstract principle being the following, that whilst solutions in contact with air under ordinary circumstances are found to generate animalcules, yet when the air is made to pass through a solution of *caustic potash* in an air-tight apparatus, the germs are arrested by the alkali, and destroyed. The meeting then resolved into the conversazione and examination of objects.

LINNÆAN SOCIETY.

The Bishop of Norwich, President of this Society, gave his first annual conversazione at his residence, 38, Lower Brook-street, on Friday evening last, May 28th. The meeting of Fellows was but small, including among them the Bishop of Lichfield, Mr. Robert Brown, Dr. Royle, Messrs. R. H. Solly, J. J. Bennett, J. Bell, W. Yarrell, Curtis, E. Foster, Ogilby, Dr. Grant, &c. &c. The next and last conversazione is fixed for Friday, the 27th June.

LONDON ELECTRICAL SOCIETY.

Tuesday, May 18. *The President in the Chair.*

The thanks of the society were voted to Charles V. Walker, Esq., Hon. Sec., for a copy of his "Electrotype Manipulation." A letter was read from Thomas Pine, Esq., describing the vegetation and respiration of plants, and the deposition of dew, as intimately dependent on the extraction of electricity from the atmosphere, by means of the pointed extremities, &c., of leaves and buds. He had experimentally discovered that the point of a living plant will draw off electricity from the prime conductor of a machine at a distance of 14 feet, when the point of a needle must be placed within four feet. He had learned that vegetation proceeded with greater vigor when the atmosphere was electrified than when merely the soil was; and had found dew drops invariably at the apex of points on the surfaces of leaves. In many instances, leaves which to the unaided vision appear smooth are found studded with these points when examined by a microscope. Mr. Pine purposes pursuing the subject in a future paper. A paper "On some general Observations on Electrotype Apparatus; and on the Construction of a Constant Acid Battery," by the secretary, was read. The author of this paper states the conclusions to which experiment had guided him, with respect to the relative advantages of the apparatus employed in this highly interesting art. He mentioned several kinds of battery, and for general use spoke in favor of the Constant Daniell's. The diaphragms he employs are plaster of Paris; they are more durable than any. The *Constant Acid Battery* consists of a jar lined with copper by the electrotype process, the action being continued till the solution from which the copper is released is exhausted. This is charged when in action with acid water only, and the hydrogen resulting from the electrotype action is very readily released from the rough surface of the copper. Mr. Walker employs amalgamated zinc, and prefers to place it within a porous diaphragm, to prevent the resulting sulphate from approaching the copper plate. Such a battery will continue in action some days, and will produce from a copper solution in a decomposition cell an exceedingly fine and firm deposit. The action is one half slower than that of a Daniell's battery; but when time is not an object, the fine and firm deposit will render this a great acquisition, especially if the operation to be performed is the coating of an object. Space will not permit us to enter further into the practical information contained in this communication.

ARCHITECTURAL SOCIETY.

The session of this society, which commenced last November, concluded on Tuesday night with the accustomed conversazione, and the rooms were most numerously attended. Mr. Tite read a lecture on the Egyptian antiquities treated of in M. Rossolini's great work, showing that the knowledge we possess of ancient Egypt, through the researches of antiquaries, is more accurate than that which we have obtained respecting Greece and Rome. At the conclusion of the lecture, Mr. Tite gave prizes to two young gentlemen of the names of Johnson and Johnston—to one for drawing from an architectural cast, and to the other for an architectural design of his own invention. He then introduced to the notice of the meeting a French method of joining iron pipes without solder, by the employment of the oxy-hydrogen blow-pipe. A model of the portico of the new Royal Exchange was exhibited, and looked exceedingly handsome. The pillars are a series of eight columns with Corinthian capitals, with a row of four behind them, while the order is carried round the building by a series of Corinthian pilasters.

INSTITUTION OF CIVIL ENGINEERS.

Mr. Sopwith called the attention of the meeting to the valuable geological sections presented by the railway cuttings, and other engineering works now in progress; this was particularly the case on the North Midland Railway, where the crops of the various seams of coal, with the interposing strata, were displayed in the clearest manner, developing the geological structure of the country which the railway traverses. Numerous similar instances induced the British Association to devote a sum of £200 (which it was believed would be increased from other sources) for obtaining authentic records of such sections, before the action of the atmosphere or the progress of vegetation should have obliterated the instructive pages of geology which the engineer had opened to view. The committee of the British Association, especially charged with this subject, were desirous of bringing it before the Institution of Civil Engineers, for the double purpose of receiving from its members those suggestions which they are so competent to give, and of obtaining from them that powerful aid and co-operation which the practical nature of their engagements so essentially enable them to afford; it was accordingly suggested that the council should receive from graduates descriptive papers and measured delineations of sections, as their communications previously to their election. Much assistance might thus be rendered; and the contributions, after having been read at the institution, might be added to the general series preserved in the Museum of Economic Geology, which under its present able direction is becoming daily more interesting both to the engineer and the geologist. Mr. Sopwith exhibited a specimen of a blank chart, prepared by Mr. Philipps, of York, for the com-

mittee. It consisted of a sheet engraved in squares, on a scale of 40 feet to an inch, containing a space equivalent to 800 feet in length, and 600 feet in height, upon which it was proposed to delineate the sections in their true vertical and horizontal proportions; the base line representing either the level of the sea at half tide, or the datum line of the railway, as might be most convenient. There would remain in every case a large portion of the sheet unoccupied by the section, and upon this it was proposed to exhibit, on a magnified scale, the details of the section; the fossils and other organic remains might also be shown, as the divisions of the squares would enable the sketches to be made of any dimensions in correct proportions. An example of these charts had been prepared by Mr. Philipps, giving a section of a deep cutting on a railway, the enlarged portion exhibiting the details of the strata at two particularly interesting points, as also of the specimens of sigillaria, stigmaria, &c. in that formation.

Mr. Sopwith also laid before the meeting a set of models, which were intended as hand specimens for the purpose of familiarly explaining faults, slips, or dislocations of the strata, and other geological phenomena, which could not be clearly demonstrated without such assistance. One of these models represented the horizontal deposition of stratified rocks, and the subsequent removal or degradation of such rocks, forming valleys of denudation. Another, by the displacement of the lower rocks, exhibited the formation of a slip dyke or fault, which was the "lode" or "vein" of the mineral miner, and the "fault" or "trouble" of the collier, as these interruptions of the continuity of the bed of coal were generally termed. Another model showed a succession of slip dykes disturbing the stratification, so as to present the appearance of a great abundance of coal at the surface by the "cropping out" or "bassetting" of a number of seams or beds of coal, whereas in reality there was only a repetition of the same beds. By examining the base of the model, and also by opening it on an oblique plane nearly parallel with, and at a short distance below the surface, it would be found that there was no coal at all. A fourth model exhibited the conditions under which some of the largest collieries in the kingdom are worked, namely, that the seams of coal do not appear on the surface, but on opening the model a vertical section is exhibited, and the several beds are shown disturbed, as in the former case, by faults or dislocations, but which have not the effect of bringing the coal to the surface. It has always been difficult to demonstrate without the aid of models the apparent form of strata, as affected by the contour of the country; sometimes the rocks form a V, pointing up the valley, and sometimes in the opposite direction. General observers and even practical miners were apt to conclude that this different direction of the point of the V indicated a different direction of the strata, but the models showed that in both cases the direction of the strata was the same; that in both cases the rocks were inclined in the same direction as the valley, the only difference being that in one case the rocks form a greater, and in the other a less angle with the horizon than the bottom of the valley. The other models exhibited the "up-cast" and "down-cast" which occur in coal mining, and intersections of veins of different ages, &c., &c. Mr. Sopwith brought forward this subject, in the hope that eventually a close union and active co-operation might be established between the leading scientific institutions of this country, and more especially that the Geological Society and the Institution of Civil Engineers would unite in promoting the progress and improvement of geology and engineering.

THE POLYTECHNIC SCHOOLS OF GERMANY.

The following notice of the objects and effects of the polytechnic schools of Germany, is extracted from a long article in the *Polytechnic Journal* for the present month.

"No one can mistake the community of character that belongs to all these German institutions; the importance attached to drawing, in all its branches, is their salient feature; an excess of subjects naturally distinct, and an excessive subdivision of subjects, whereby unnatural distinctions are created, is their prevailing error. On the subject of drawing we are of the same mind as the Germans; its importance cannot be overrated. The ability to draw is a faculty only, it is true, but to him who possesses it, it answers the purpose of an additional sense. But if these institutious propose doing anything more than preparing a man for practice, if they affect to turn out finished workmen or artisans, they will fail sadly: if they do propose more than preparation, they attempt too much. Again, if it be necessary to fill the heads of practical men with a great deal more knowledge than 9999-10,000ths of them will ever want, or be able to apply should they want it, the best way of so doing is to adopt as simple a plan as possible, to avoid mystification of every kind, above all, terminological mystification, and to allow the connection and apposition of the sciences to impress themselves on the mind by means of a natural development of principles, instead of by the startling, but, at the same time, ill understood violence of monographical instruction. Thus much of criticism on the general system pursued; now let us estimate the actual results, calculate the probable ones, and observe the difficulties and obstacles with which this well-intended scheme is encompassed.

"It should be borne in mind that in Germany the state is a trader as well as a craftsman; government monopolies are considered fair means of raising revenue; and seeing what a very small quantity of capital there is in the country, how little honored trade is, and how fiercely the passion of stock-jobbing rages, government monopolies would appear to be the best means of creating employment for surplus labour. This state of things obtains less in Prussia and Saxony than in Austria and Hanover, but still it does obtain throughout the Germanic Confederation, and in no small degree. Again, in a few years after the peace, the sovereigns of Germany began to find out that the manufactories which had sprung up under the protection of the unnatural continental system could not stand competition with those of England and Belgium, into which last country English capital had been carried. The interests, however, that would be affected by the determination of the question whether these manufactories should or should not be preserved, were sustained by a physical power too great to permit any hesitation on the subject. The governments felt that the inland manufactures must be supported; they knew full well that they could not create capital, but they believed it to be in their power to create skill; they felt certain that a knowledgo of the principles of his craft could not but be useful, nay, even a source of satisfaction, to every workman; and they conceived that genius itself would not be more slow of development because it was not self-taught. To encourage manufactures, however, it is necessary to make intercommunication regular and expeditious; in other words, to build good roads, and to construct canals. Here there arose a necessity for civil engineers, and for men qualified to act under them. To the necessities of the public service, then, and to the consequences of the continental system, must the establishment of polytechnic schools in Germany be attributed. The necessities of the public service have been supplied; the state does possess persons capable of superintending those arts and crafts which a government may, and in some cases should, practise; the master manufacturers too, and the overseers and managers, are men possessed of competent theoretical knowledge, in addition to their familiarity with the application of it; but the system has effected nothing for the mere artizan and laborer; nay, so far as he is concerned, it has utterly and confessedly failed; witness the complaints about non-attendance, witness the establishment of Sunday-schools for journeymen and apprentices, as compliments to the polytechnic institutions. If the working artisan will not attend, it is clear that the system must fail to produce such a race of working artisans as the governments would fain call into existence. If Sunday-schools are indispensable compliments to the polytechnic institutions, it is clear that the latter, though conducted on a plan logically perfect and consistent, are useless to certain classes among those for whose benefit they were established, and this becanse thoso classes are not capable of receiving the benefits offered them. Nor is such incapacity confined to those who attend the Sunday-schools, and who are generally lads or unmarried young men; a large number of those more advanced in life are deterred from attending either the institutions or the schools, because they feel themselves incapable of profiting by them; and their number is not less than that of the persons who are too exhausted by the fatigue of their avocations to summon up the resolution necessary for study. In short, these institutions have failed to accomplish that portion of their scheme which relates to the humblest class of workmen, because that class is not prepared, by previous instruction, to understand and digest the information communicated to them.

"This failure being an admitted fact, and it being also an admitted fact that the system has not failed to produce both master manufacturers and managers in every way superior to those of the generations of which the present is the immediate successor, we may draw the conclusion, that the polytechnic institutions of Germany may be imitated when the production of intelligent and able superintendents is all that is required, but that they should not be imitated when the problem to be solved is, how shall the intellectual potentiality of the mere artisan be increased? Now in our own country it is this last problem that agitates the minds of men. To deny that the master manufacturers are men of great and cultivated powers of mind would be absurd; to impute ignorance, clumsiness, or dulness to the class of superintendents would be equally idle; their success is the best answer that can be given to those who may be bold enough to dispute their fulfilment of the conditions on which perfection in the arts depends; but it must be confessed, notwithstanding the cheering results of the establishment of mechanics' institutions, that the intellectual state of working men does not bear that relation to the moral vigor of their superiors which it should. For the existing generation of workmen nothing can be done by way of education; much may be effected by cheapening knowledge, by throwing open museums on Sundays and holidays in the intervals of service, by establishing zoological and botanical gardens, and by forming collections of models; but in the way of education nothing can be done for them. Something, however, nay, a great deal, may bo done for the generations that shall succeed."

OSCILLATING STEAM-ENGINES.

Though the invention of oscillating cylinders for steam-engines has been known for some time, it was not made practically available until recently, in the engines of the small steam-boats on the river Thames. The convenience of this peculiar arrangement, independently of any mechanical advantage it possesses, adapts it admirably for steam-boats of small dimensions, in which every inch of space is valuable. In these engines the cylinders vibrate backwards and forwards each stroke of the piston, and by this means a more direct action on the crank is obtained in the same direction as the line of motion, and a great many parts of the usual machinery are also dispensed with. The crank is attached immediately to the piston-rod without the intervention of a connecting-rod, and though in its revolution it approaches close to the top of the cylinder, it has a more direct impulsiou than can be otherwise obtained by using the longest connecting-rods, with the parallel motion and other machinery generally requisite.

A new steam-boat, intended to ply on the river,

constructed on this principle by Messrs. Gordon and Co., of Deptford, under the superintendence of Mr. Stone, was tried on Saturday last, when a number of their friends were invited to prove the working of the engines by a trip to Gravesend. The vessel itself, named the *Atalanta*, as well as the engines, was constructed at Messrs. Gordon and Co.'s yard. It is about 90 tons burden, and is propelled by two engines of fifteen-horse power. The length of stroke is twenty-four inches, which is longer than the stroke of the pistons of the engines of the Iron Steam Boat Company. The action of the engines was in every respect highly satisfactory, and the vibration of the boat was much less than usual. The speed could not be fairly tested, as one object of the trip was to witness the first sailing match of the season of the Thames Yacht Club. The *Atalanta* was therefore frequently obliged to lay to, or to "move ahead easy," as the yachts progressed, but on returning she made her way with the fastest steamers on the river.

SCIENTIFIC MEMORANDA
AND
NOTES ON ART.

Turkey Carpets.—A correspondent suggests that very considerable employment could be given by the manufacture of carpets, to be woven in the same manner as those imported from Turkey and Persia. He considers it probable that from our superiority in manufacturing skill we might soon become considerable exporters of the article. The simplicity of the weaving and of the construction of looms would enable women to work at them.

Discovery of Coal in the South Seas.—Steam Navigation between England and Australia.—On the 22d inst. an interesting paper was read from Capt. M'Cormick, R.N., before the Royal Philosophical Society, on the geology of Kergueland's Land, in long. 67 east, and lat. 48 or 49 south, which is situated near midway between the Cape of Good Hope and Australia, wherein he announces the discovery of coal in this island, and which acquires great importance from the circumstances of its being favorable to the promotion of steam navigation between England and that country.—*Cambrian.*

Spirit from the Mango.—The discovery that a very wholesome spirit, something similar to gin, could be manufactured from the mango, was made some two years ago in Grenada,—and there was some talk at the time in Jamaica about establishing a distillery there. The mode of proceeding is very simple:—A vat is as nearly filled as possible with the ripe fruit, and as much water added as will cover them. They are then allowed to remain from thirty-six to forty-eight hours, until fermentation commences, when the seeds are divested of whatever pulp may still adhere to them, and care is taken to retain the whole of the rind and pulp in the vat. Thirty-five per cent. of water is next added, and five per cent of sugar or molasses. The whole is then allowed to ferment for five or six days, when it is transferred to the still, and the process conducted in the usual manner. The spirit thus extracted is mild, and has nothing of the pungency of new rum. It is described as strongly resembling in taste British gin; and this flavour is derived, without doubt, from the essential oil, contained in the rind of the fruit. It is free from empyreuma, and is pleasant and slightly saccharine. In Grenada, fifty gallons proof 25, were obtained from "a very inconsiderable quantity" of the fruit; but it is to be regretted, "the quantity" had not been specified. Considering the deficiency in the staples of rum and sugar from the West Indies, for the last two or three years, this discovery may be considered of great importance in a financial point of view, since, should it become an article of export, it may in some measure compensate for the falling off of the revenue. It rests however with the West Indians, whether, or not, to avail themselves of this very valuable discovery. The capital required for a mango distillery would be very small, while it appears to us, that if the spirit were used in varnishes alone, it would be a very profitable speculation.—*Belize Gazette.*

Statistics of the Lancashire Factories.—Of the 1,123 cotton manufactories in 1839, 820 were in Salford hundred; 163 in Blackburn; seventy-one in West Derby; thirty-nine in Amounderness; sixteen in Leyland; and fourteen in Lonsdale, exclusive of sixty-two unoccupied mills. The number of persons employed in the cotton trade of the county in 1835, were 122,991; in 1838 and 1839, 152,150, of whom 57,784 were young persons betwixt the ages of 13 and 18. About four-fifths of the cotton trade of the kingdom centres in Lancashire; and in 1825 the capital vested in buildings and machinery in that district was estimated at £8,000,000. The declared value of cotton goods exported in 1814 was £17,241,884; and of twist and yarns, 1814, £2,791,248; in 1838, the value of cotton goods exported was £16,700,913; and of twist and yarn, £7,431,844. In 1838 and 1839, the woollen manufactories in the county were 96, number of hands 4,957, of whom 1,727 were young persons; silk manufactories 31; hands 5,591, of whom 2,143 were young persons; flax concerns, 16, hands, 2,881, of whom 1,392 were young persons; worsted 12, hands, 924, of whom 418 were young persons. The total number of manufactories was 1,278, principally in Salford and Blackburn hundreds; total hands employed, 166,493, of whom 63,664 were young persons from thirteen to eighteen. The number of unoccupied mills was 192; and of mills from which the returns were incomplete, 10. The number of calico printing works is about 75; bleaching works, 50; hat manufactories, 80; collieries, 330. In 31 of the parishes there are cotton and other mills; in 16, cotton weaving prevails; and in 21 there are no manufactories. The quantity of yarn spun daily in cotton mills in Lancashire by steam, is as much as would have been spun with the distaff and the spindle by 38,000,000 persons. The yearly consumption of coal by all the steam-engines in the country is about 3,000,000 tons.

Turpin on the cause of the Red Color of Agates.—The red color of Agate is owing to a number, greater or smaller, of *Protococcus Kermesinus* (one of the lower Algæ), accumulated together, or more frequently reduced to their small red globules (seminules) agglomerated or coagulated, and distributed, according to certain circumstances, in the colorless structure of these silicious compounds. By microscopic and comparative investigation, Turpin was led to conclude that the various colors, orange, rose, blood-red and reddish-brown (varieties owing to more advanced growth) which are enclosed in, or which surround the translucid and colorless structure of different kinds of Agates, will be found to be owing to the presence either of red globules, uniformly mixed as in the Carnelian Agate, or agglomerated into small irregular clots, and distributed in circular waves, according to certain forms or conditions which existed at the time of the silicious conglomeration; or finally, though more rarely, to these small red vegetables themselves, quite entire, and most distinctly visible with the microscope. It is impossible to find a resemblance in color and polish more striking than that which is seen in a white glass phial filled with *Protoccus Kermesinus*, when compared with a carnelian, as may be fully established by the trial.—*Turpin in Jameson's Journal.*

Sir James Anderson's Steam Carriage.—A Dublin paper gives the following account of a trial of Sir James Anderson's steam carriage, of which we had not heard for some time previous.—"On Saturday one of these carriages was run on an experimental trip through the city, by Mr. Jasper Rogers, Sir James's partner. We saw it in Sackville-street, and kept it in view until it made a sweep opposite the club-house, at the door of which it stopped, having been guided with the greatest precision close to the flagway. After remaining a little time, while Mr. Rogers appeared to have called at the club, it started down Sackville-street, running directly through a considerable space of newly-laid-down stones, and, we believe, turned down Eden-quay, where we lost sight of it. A carriage was attached, filled with the engineers and workmen, and literally covered with others, who contrived to get upon all parts of it. There was not the least appearance of steam, and no more noise than from any ordinary conveyance. Its speed was considerable, although running in and out between all the vehicles, &c., in the street, which was crowded to excess, and we cannot imagine any thing more perfect than its management. Mr. Rogers, who guided it, appeared to do so with the greatest ease, and complete confidence in the power possessed. The speed was several times reduced and increased, as the necessity seemed to require; and although such a machine, moving at so great a velocity, and with apparent innate life, would naturally be supposed to produce a startling effect upon horses (as it well might upon ourselves), we did not see the least fright exhibited by any. We were, indeed, surprised and gratified by the appearance of this carriage openly in the daylight, and cannot but wish Sir James Anderson and Mr. Rogers the success they deserve, for the completion of so arduous an undertaking."

VARIETIES.

Departure of the Great Western.—This noble vessel sailed from King-road at half-past one o'clock, on Thursday week. She had forty-two passengers, chiefly ladies. She carried a valuable cargo of silks, and £24,000 in specie. Bets are made that she will make her voyage in 13½ days.

Birth of a Giraffe.—On Thursday week the Giraffe, at the Zoological Gardens, in the Regent's Park, brought forth a fine male. The mother and the offspring are doing remarkably well.

Savings Banks, &c.—From a recent Parliamentary return we find that the number of individual depositors in savings banks, at the close of the quarter ending Nov. 20, 1840, amounted to 782,374, the sum total of whose deposits, including interest, was £21,979,797. The sums deposited by charitable institutions and friendly societies amounted, at the same period, to £1,491,253. The amount of money received from the trustees of savings banks by the National Debt Commissioners (including friendly societies), from August 6, 1817, to Nov. 20, 1840, was £26,704,588.

Boston Ice Trade.—The *Evening Journal* states that there are now sixteen companies in Boston engaged in the business of shipping ice to the East and West Indies, and to New Orleans and other southern ports. The demand for the article is now so great for exportation that large contracts have been made for it in Worcester county, to be transported to Boston by railroad. They formerly sold their ice in New Orleans at six cents a pound, but now sell it at one cent, and where they made one dollar at selling it at six cents, they now make four dollars by selling at one cent a pound. When it sold at six cents none but the wealthy could afford to purchase, but at one cent all classes buy it, so it is sold before much of it is wasted by melting. The ice is sawed by a machine into square blocks, not less than twelve inches thick, and is packed on board the vessels with straw and hay, boxed with thin lumber and made air-tight. One of the Boston companies paid last year 7,000 dolls. for the straw and hay they used for packing.—*Baltimore American.*

Spurious Tea.—At a recent public sale of teas, imported per the Seringapatam, a lot of those offered for sale was protested against as not being genuine teas, and no sale of them could be effected. It is stated that in the probable scarcity of supply from China a quantity of dried leaves has been packed up eastward of the Cape, and imported as genuine tea. Even leaves of British preparation might thus be sent out and re-imported as genuine tea.

The first stone of the bridge which is to connect the city of Venice with *terra firma* was laid on the 26th ult. with great ceremony.

Launch of a War Steamer at Leith.—The launch of the Forth took place on Saturday last. The length of the spar deck of this war steamer is 229 feet; length over all, 245 feet; depth, 30 feet three inches; breadth within paddle-boxes, 36 feet two inches, and over ditto, 60. (The paddle covers, we may mention, are Smith's patent boats.) The tonnage, old measurement, is 1,353; new ditto, 1,940. She will have two engines of 225 horse power each, which are to be put on board at Liverpool, by Mr. Bury, of that town; and she is to be fitted up with separate state cabins for no less than 100 passengers.—*Edinburgh paper.*

Steam-Boat Accident.—On Monday afternoon a fatal accident occurred in Long Reach near Gravesend, while the General Steam Navigation Company's steam-vessel City of London was returning from an excursion to Sheerness with a large company on board. Two boys, in defiance of an order from the captain, got upon the paddle-box, and almost immediately afterwards the steamer happening to give a lurch, one of the lads fell overboard and dragged the other boy with him. One of the boys was picked up by two fishermen of Gravesend, who were being towed a-stern in their boat. Captain Grant, the master of the steamer, his crew and the fishermen, looked after the other boy in all directions, but could not find him, and he was drowned.

Wool grown in Ireland is continually sent over to Leicestershire and Derbyshire, where, having undergone the process of manufacture, it is actually sent back again as hose to the country where it was originally produced.

Chase of Dogs on the Taff Vale Railway.—On Wednesday last, as the eleven o'clock train was proceeding to Cardiff from Merthyr, on nearing Newbridge a fine greyhound and a terrier were observed by some of the passengers running at the top of their speed between the rails, a few yards in advance of the train. After running some five or six hundred yards they crossed the left rail, and still, side by side, continued the race, evidently in great terror, the terrier, singular to relate, being about a head in advance of the greyhound. The train was going at a fast rate, and the little distance between the dogs and the engine rapidly diminishing, when the engineer attempted in vain to drive them off the road by throwing large pieces of coke at them. The poor creatures, however, seemed fascinated, and whilst the writer of this paragraph (a passenger), feeling assured that both would be killed, was anxiously waiting the issue, he suddenly lost sight of the terrier, whilst the greyhound, being passed by the engine, crouched down on the road, with tongue extended, evidently all but exhausted. The writer's conjecture as to their fate was partly verified, for on looking back, he beheld the poor terrier extended between the rails, with his head cut completely open, and his more fortunate companion, the greyhound, standing over him.—*Hereford Times.*

Wonders of Steam.—Two gentlemen left Brussels at three o'clock in the afternoon of Friday, and arrived at Liverpool at a quarter before seven P.M. on Saturday, being a distance of 430 miles, performed in the short space of 27¾ hours. The whole of the journey was performed by steam. The travellers left Brussels by railway on Friday afternoon, arrived at Ostend in time for the packet, were landed at Blackwall, proceeded from thence to London by the railway, and just caught the train from London to Liverpool as it was starting.—*Liverpool Times.*

Effects of Railways.—Previous to the opening of the Great Western Railway between thirty and forty coaches daily passed through Marlborough; there are now only five.

On the Influence of a low temperature on the Infusoria.—The researches of Ehrenherg agree with those of Spallanzani, and prove that cold is generally fatal to Infusoria, especially to the *Rotatoriæ*. It is even more destructive to the living animals than to the eggs; but water when recently thawed may be found inhabited by individuals which have escaped death, and enclose the germs of future generations. The animals generally die after they have been encased in ice from one hour and a quarter to two hours, but it appears that at the moment when congelation of the water takes place, each animalcule is surrounded by a small cavity, which seems to be the result of its proper heat. A sudden thaw always produces a fatal effect on the Infusoria. They are found in winter at the lower surface of ice, covering ponds, &c.—*Microscopic Journal.*

Ophthalmic Hospital.—A general meeting of the officers of this institution was held on Thursday, in the board-room of the establishment in King William-street, Charing-cross. Lord De Grey took the chair. The secretary read the report, from which it appeared that there had been 630 patients admitted during the past year, which was more than the preceding one; the numbers being in 1840, 173 in-patients and 3,760 out-patients. In the year 1840, 98 operations had been performed for soft cataract, hard cataract, and for artificial pupils, and of the 81 for cataract 78 had succeeded, independently of which 550 operations had been gone through with much success for the cure of squinting.

Five Children at a Birth.—The *Nashua Telegraph* says, that a Mrs. Ripley, of Londonderry, New Hampshire, was some weeks since safely delivered of five children at a birth, and they are all doing well. The same woman had three at one birth five years ago, all of whom are alive, and in good condition. The editor says, he at first doubted the truth of the story, but inquiry satisfied him that it was true.—*New York paper.*

The four giraffes, just landed at Portsmouth, have been purchased by Mr. Wombwell, at an expense of £2,000 for exhibition in his travelling menagerie, and these interesting animals are deposited at his yards in the Commercial-road.

Manufacturing Distress.—A correspondent, who was this week at Huddersfield, made a very diligent inquiry as to the cause of the distress, and was assured it was not so much owing to want of work as to want of an adequate remuneration for the work done. The operatives are ground down by the mill-owners, who extort from them an unreasonable quantity of work for the slender wages they afford, and by competing with each other, endeavoring each man to undersell his neighbour, they have brought all the distress upon the operatives which now prevails: the mill-owners seek to make their increased sales compensate for their diminished profits. The repeal of the corn laws would make matters ten times worse, and that the operatives now thoroughly understand.—*Standard.*

In every part of Germany, the excitement against the treaty of navigation between England and the Commercial Union is great, especially among the manufacturing classes.

Silver coin and bullion shipped at Dover, from May 1 to May 31:—198,910 oz. of silver; 1,080 oz. of gold coin.

The President Steam Ship.—Hopes are still entertained that this ship is not lost. A letter from Liverpool, dated Wednesday evening, says—"A great sensation was produced here to-day, in consequence of the rumored safety of the long-missing steam-ship *President.* The information was conveyed by the *Fortitude*, Captain Arbuthnot, from Buenos Ayres, who states that when in lat. 47 north, long. 24 30 west., on the 25th of May, at five o'clock A.M., he saw a very large steamer steering to the north-east, and making but slow progress. She was without a funnel, crippled foremast, large paddle-boxes, painted a dark color; had a large square topsail set on the maintopmast, topgallant sail on the foretopmast, and fore-and-aft sails. The most experienced nautical men believe her to be the *President* steam-ship; but there are others who think that, as the *Britannia*, from Halifax, is now overdue, it may turn out to be the latter steamer."

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THE

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APPLICATION OF POWER AGAINST GRAVITATION.

We have given in another column copious extracts from Mr. Adcock's account of his newly-invented spray engine for raising water from mines. The facts stated involve some curious and highly interesting problems, which have not yet been sufficiently examined, and which will, we feel persuaded, be the means, when fully understood and applied, of producing important changes and improvements, not only in the mode of raising water, but in other applications of moving powers.

We regard the results of Mr. Adcock's experiments with peculiar interest, as they strongly confirm our views of the action of moving forces, and of the relations between velocity, power, and resistance; and they serve also to authenticate our theory of the nature of the action of hydraulic belts,* founded on our previously-conceived views of the measurement of resisting force. It appears to us, however, that Mr. Adcock is not himself aware of the cause of the advantages which he alleges to be gained by his spray engine, and he attributes them to causes which we conceive can have no operation in producing the stated effects. There are several of his opinions also which we believe to be based on insufficient premises, to which we shall presently allude; but we wish, in the first instance, to show—assuming the facts stated to be correct—that they may be satisfactorily explained on the same principle as we accounted for the powerful action of hydraulic belts.

The effect of the hydraulic belt we attributed in our former article entirely to the rapidity with which the water is propelled upwards; the amount of power exerted by all constantly acting forces being in proportion to the time of their action. As the amount of the resistance of gravitation consequently depends on the time of its action, the more rapidly a body moves through a given space against that force, the less total resistance will be experienced, as it has less time for the exertion of the resisting power. The resistance of gravitation to be overcome in lifting or suspending a column of water will be the same, whether the water be stationary or be moving with great velocity. The additional power required is merely that necessary to give the increased rapid motion to the fluid, without any reference to the resistance of gravitation, which we suppose to remain constant at all velocities.

The same principle will equally apply in accounting for any advantage gained in the spray engine. It is the rapidity with which the drops of water are propelled against the force of gravitation that must cause the diminution of that resistance against each drop, and against the aggregate mass of water raised. A drop of water propelled upwards against the force of gravitation at the rate of 32 feet in a second would, were there no atmospheric resistance, be brought to rest when it had ascended about sixteen feet. If the same drop of water were propelled with double the velocity, it would rise sixty-four feet before it came to rest; and that would be at the end of two seconds, because the force of gravitation remains constant, whilst the velocity of the moving body acting against it would be in this case doubled. When the velocities are further increased, the advantages increase in the same ratio.

It matters not in theory, whether the increased velocities be applied to single drops, or to a continued stream of water; the same effects in diminishing the resistance of gravitation will be produced in either case, provided the velocities be equal. In practice, however, we conceive the rapidly-moving stream would have the advantage, as the water would meet with less resistance from the air when moving in a continued column, than when disseminated into drops. If, therefore, the same amount of force which Mr. Adcock applies in his spray engine, could be made to communicate as great a velocity to a continued small stream of water as to the drops, the effect, we feel persuaded, would be increased.

It will be perceived, however, on reading Mr. Adcock's description of his engine, that he considers the division of the water into drops essential to the principle of his engine; the whole course of reasoning, by which he arrived at his successful results, being founded on this, as we conceive, erroneous opinion. He admits himself to have been astonished at the unexpected effects of his engine, which, as he observes, caused him "much anxiety of mind." He alludes, rather darkly, to some unknown, or unheeded, law of nature, as having been the cause of these unexpected results. To us, however, the law of nature seems simple and intelligible; it is merely the inverse operation of the same law which governs the action of gravitation on falling bodies; the distance traversed in either case being as the square of the increased velocity.

The great error which pervades Mr. Adcock's theory is this: he assumes the possibility of gaining power or advantage in lifting a weight by dividing it, and carrying it up in separate portions. It is true, that when the power employed is not sufficient to lift the load, it is of immense advantage to be able to divide the burden, and carry it by different efforts; but there is no gain of power by this division of the weight. A weight of one hundred pounds would require the same amount of power to lift it one hundred feet, whether it were raised at once, or lifted in as many successive efforts as it contains pounds, provided there be no material difference in the velocities with which the loads are moved. The real advantage derived from dividing the weight is, that it allows the power to be exerted more energetically in communicating rapid motion; and thus, if we may be allowed the expression, cheating gravitation of its customary amount of resistance.

There is in fact no loss of power as usually applied, in having to work against a column of water 1,000 feet deep in pumping; and if the pipes could be made strong enough, it would be better to work with one lift than, by dividing the column into ten, to increase the friction. The weight of water in the "solid column" that acts against the piston would exert an equal aggregate amount of resistance were it brought up in separate buckets full. For example: if we suppose the pipes to be of the same diameter as the pumps, each stroke of the piston, say of ten feet, would raise the whole column that height. Only ten feet of water would be thrown out by the stroke, but the whole column would be raised as gradually and with as little waste of power as if the pipe were divided into separate lengths of ten feet each, and the water in each length was separated from that below it. If, again, we suppose the area of the pipes to be one half less than that of the pump, then every ten foot stroke of the piston would raise twenty feet of water. Were it not for the friction of the water against the sides of the pipes, the same effect that is produced by the hydraulic belt might be accomplished in pumping, by having the pipes of very

* Inventors' Advocate, No. 79.

small diameter compared with the pumps, so as to give the ascending column the requisite velocity. This is, however, impossible, and the best mode hitherto contrived of giving rapid motion to a column of water is by the hydraulic belt, unless indeed it should be found that Mr. Adcock's plan of forcing it upwards by compressed air be really more advantageous.

In Mr. Adcock's preliminary investigations with regard to the velocity of the descent of rain drops, and the resistance they encounter from the atmosphere there seems to be an elementary error, which must render his calculations in some degree inaccurate. He assumes that the drops of rain are in their formation of the same size as we find them when they reach the earth. Now reason and experience prove that rain drops are formed by continued agglomeration, as the minute particles which constitute the original nucleus descend through the misty atmosphere of condensing vapour. This consideration must consequently materially affect any estimate of the resistance of the air to drops of a given size assumed to have fallen from a great altitude, whereas, in fact, the size of the drops of rain has been increasing through every yard of their descent. This remark does not, indeed, affect the principle of Mr. Adcock's engine, but merely the estimate of its effect; practical application alone can test its efficacy. What we are chiefly anxious to establish is, that the principle on which the alleged advantages of the spray engine depends is not the division of the weight, but the rapidity of the motion; and we contend that if an equally rapid motion were imparted to a "solid column" of water the quantity raised would be greater in proportion to the power employed.

MR. ADCOCK'S SPRAY ENGINE.

In a pamphlet published by Mr. Adcock, descriptive of his new spray engine, intended as a substitute for pumps, for which he has taken out a patent, he explains at length the experiments and the process of reasoning on which his invention is founded. We extract from this publication the following curious particulars.

Alluding to former experiments for the improvement of pumps, he observes:—

"Eventually, I proposed to myself the question—Is it possible, in the raising of water from mines and other deep places, to do without clacks or valves altogether? I knew this desirable effect could not be produced, if the water had to be raised from the mine in a compact or solid state, as in pump work. For in a pit, 1,000 feet in depth, the column of water being also 1,000 feet, the pressure of the water against the sides of the pipe at the bottom of the mine would be about 440 lbs. on each square inch, and no pipe that could be conveniently applied in practice could resist that pressure: I therefore, in the next place, questioned within myself, whether the water could not be brought up from the mine in a divided state; and the obvious reply to it was, if the water be brought up in a divided state, it must be in the state of vapour or of rain.

"The chain of reasoning, thus far continued, led me to investigate the descending velocities of drops of rain, compared with what those velocities should be, by the laws of gravitation, and I found that, by the laws of gravitation, the rain ought to descend towards the earth with a speed constantly accelerating, so that, if the cloud were high from which it fell, it ought, by its velocity, and consequently its momentum, to inflict evils of a serious nature on all animal and vegetable life. Then, how is it that such effect is not produced?—Simply by the resistance of the air. Each drop of rain while in the cloud may be considered to be in a quiescent state. It begins to descend, from a state of rest, with a motion constantly accelerating, and thus it continues until it acquires a certain amount of speed, from which time forth the motion of its descent is uniform.

"This uniformity of motion is produced by the resistance of the air, by its not being able to flow from beneath the drop beyond certain rates of speed under certain amounts of pressure, and the ultimate amount of pressure being determined by the weight of the drop. Hence, the drop descends with an accelerating speed at first, compressing the air more and more immediately beneath it, until the resistance and the compression become equal to the weight of the drop—thenceforward its motion is uniform.

"I then proceeded to investigate the greatest descending velocities of drops of rain, and I found that, under ordinary circumstances, they were from eight to twelve feet in a second, from which time the remaining portion of the reasoning was clear and decisive—viz., if water in globules, of a certain size and weight, like drops of rain, cannot, under ordinary circumstances, and in consequence of the resistance which they meet with in the air, descend with a greater speed than twelve feet in a second, then it is certain that if these drops were in a quiescent state, and a current of air were made to move upwards, at a greater speed than twelve feet in a second, those drops would flow upwards instead of downwards, and that too, whatever the height. Hence the invention was perfected. I had only to try the experiment in secret. It far surpassed all that I had expected from it, and I forthwith secured the patents; but other effects have resulted in practice which I never calculated upon nor expected. I have had an apparatus made, on the patent principle, to raise, agreeably to an order which I had received, forty gallons of water in a minute, forty-two feet in height. It was erected at the works of Messrs. Milne, Travis, and Milne, at Shaw, near Manchester. The fan, which gave motion to the air, was only three feet diameter, and one foot wide, and it made about 900 revolutions in a minute. Instead of raising forty gallons forty-two feet in height, it raised at the rate of 130 gallons of water in a minute 120 feet in height.

"This effect, so much greater than it ought to have been for the power expended, caused me, for some time, much anxiety of mind. It seems to have arisen from a law of nature, which is but little known or understood by practical men. Without entering into details, it is sufficient for me to state, on the present occasion, that the natural tendency of the current of air upwards, from the fan at Shaw, was 116 feet in a second—a speed, I believe, hitherto never obtained, or conceived to be possible, in the raising of weights."

Mr. Adcock then continues—"By the present mode of raising water from mines and other deep places, by pumps and pump-rods, and other mechanical contrivances, the water is raised through a series of pipes, in a compact or solid state; in other words, if the depth through which the water must be raised, by one pump or one lift, be 100 feet, then the pipes, extending to that depth, will be full of water, and the whole column of water in those pipes will be lifted at one and the same time. A column of water 100 feet deep, presses with a force of about 45 lbs. on each square inch of its base—hence, if the diameter of the pump bucket, or plunger, be twelve inches, and its area, as a consequence, 113 inches, the weight of water to be lifted, at each stroke, will be about 5,085 lbs. In a deep mine, therefore, containing ten such columns or lifts of water, below one another, and acted on at the same time, by the same pump-rods, extending down the shaft or pit of the mine, the weight of water to be raised will be very great, being not less than 50,850 lbs., or about twenty-three tons—hence, to lift such a weight of water, and to overcome the friction of the water in the pipes, together with the vis inertiæ to put such columns of water in motion, and to support its own weight, the pump-rod must be made of great strength; and the steam-engine, water-wheel, or other prime power, by which the effect must be produced, must be of large size and great power. By consequence of this vis inertiæ, the friction, and the great weight to be put in motion—and when steam-engines are employed, the alternate action or reciprocation of the great lever or beam of the engine—the number of feet of effective strokes made per minute is comparatively small, being generally, in deep mines, from about fifty to eighty feet. To explain this more fully, the whole mass of water in the ten columns, having to be raised at one and the same time, and therefore being equal in weight to one column of water of the same diameter and 1,000 feet in depth, may be considered as being lifted in the mass, through a distance of fifty, or from that to eighty feet in a minute; whereas, by my improved process, I do not raise water or other liquids in the mass, nor do I find it necessary to exert a pressure, at one and the same time, of 45 lbs. on each square inch, when the height to which the water must be raised is 100 feet; nor do I raise water by pumps and pump-rods, but in the manner now to be described—that is to say, by the aid of a steam-engine, water-wheel, or other prime mover, I give motion to a fan, or fanner (such as is used very commonly by foundrymen, engineers, millwrights, and others, to force a current of air into cupolas and other kinds of furnaces), or to the piston of a blowing cylinder (such as is used by ironmasters and makers of iron, to force a current of air into blast-furnaces, for the reduction of ores), and, by aid of such a fan or fanner, or blowing cylinder, I condense atmospheric air, that it may, when liberated from its confinement, have a tendency to escape into the atmosphere, with a velocity due to its pressure.

"When atmospheric air is condensed to $\frac{1}{4}$ lb. pressure per square inch beyond the atmospheric pressure, and is liberated from its confinement, it moves, or has a tendency so to do, at the rate of 173 feet in each second of time; at $\frac{1}{2}$ lb. pressure per square inch, the speed due to the pressure is 245 feet per second; at $\frac{3}{4}$ lb. pressure, 296 feet; at 1 lb., 340 feet; at $1\frac{1}{4}$ lb., 375 feet; at $1\frac{1}{2}$ lb., 410 feet; at $1\frac{3}{4}$ lb., 436 feet; at 2 lbs., 467 feet; at 3 lbs., 555 feet; at 4 lbs., 624 feet; and at other pressures, with other velocities or rates of speed. Now, instead of raising water in the mass, as hereinbefore described, by pumps and pump-rods, and such like contrivances, I avail myself of the mechanical effects that may be obtained from the velocities of the air, as due to the pressures herein-before made known, or any other pressures that circumstances connected with mines, in different localities, may prove to be desirable. I cause the water that must be raised from the mine, or from a lower level to a higher, to be dispersed and carried up in drops, like drops of rain; but the velocity of those drops, upwards, in consequence of the velocity of the air, is far greater than the descending velocities of rain. For drops of rain, when not receiving an impulse from winds, can only descend through the atmosphere with a speed of about eight feet in a second, when the diameter of each sphere or drop of rain is the hundredth part of an inch. When the diameter of the drop is the sixteenth part of an inch, the greatest descending velocity through the atmosphere is about seventeen feet in a second; and the velocities in a second, through the atmosphere, for drops of rain of other diameters may be thus stated; for drops of rain an eighth of an inch diameter, twenty-four feet; for drops three-sixteenths of an inch diameter, thirty feet; and for drops a quarter of an inch diameter, thirty-four feet per second. Whereas, the velocity of the air, when allowed to escape from a pipe upwards at 1 lb. pressure per square inch beyond the atmosphere, and without making any deductions for the friction against the sides of the pipes, is about 340 feet in a second. But it should

be stated that, when the air is commingled with the water that must be carried up by it from a mine, or from a lower level to a higher, its motion, to a certain extent, is retarded. The velocity of the drops of water upwards, however, by this mode or by these modes of raising water from mines and other deep places, is far greater than the velocities at which rain usually descends, as herein-before has been described."

We learn from the *Mining Journal* that Mr. Adcock's spray engine is about to be practically applied at the Pemberton Pit, Wigan, which is under the management of Mr. Robert Daglish. The pit is 100 yards deep, and Mr. Adcock proposes to bring up from that depth from 240 to 300 gallons per minute, and it is said from a preliminary trial already made, there appears to be no doubt as to the success of the invention.

THE VENTILATION OF MINES.

We have lately translated some articles from the *Fanal*, relative to new plans for the ventilation of mines. The importance of the subject induces us to return to it, for the purpose of noticing some other systems of ventilation, which are mentioned in subsequent numbers of that journal, and to induce the trial of their respective merits.

The plan of M. Pelletan consists in conveying steam through a pipe to a certain depth, and allowing it to escape in a jet at the bottom; the pipe being turned upwards like a syphon for that purpose. This plan appears of very doubtful efficacy, for as the steam would be condensed nearly as soon as it issued into the cold air, the blast, we conceive, would have little effect in causing an upward current. The writer in the *Fanal*, on the contrary, imagines that the steam jet would prove very beneficial, and he is of opinion that it would not be necessary to carry the steam-pipes so far down the shaft as M. Gonot, the chief mining engineer, who intends to adopt it, proposes. We think, on the contrary, that the chief advantage to be derived from this mode of ventilating, would be found to consist in heating the air of the shaft by the steam-pipes; consequently, that the farther they are carried down the shaft the better.

M. Latoret has made many comparative trials of the ventilator of Cabaret, consisting of four or eight revolving vanes, and of the Archimedes screw, which were in favor of the former. This question of their respective merits might, it is observed, be easily determined by fixing the vanes in the cylinder of the screw, as adopted by M. Motte, and described in the *Inventors' Advocate* last week.

M. Latoret has invented another mode of ventilating, of which the *Fanal* speaks highly; it depends on the application of "centrifugal force." This apparatus is thus described. It consists of a mill of four flat vanes fitted to a revolving shaft. Close to the axis of the shaft are two openings on the right and left, like the openings through which the air is admitted in portable ventilators. These openings communicate with the ventilating shaft, which is closed on all other parts. When the vanes or wings are put in action, the air is thrown out in all directions, like the sparks of a Catherine-wheel, and the air continually rushes up the shaft to fill the temporary vacuum caused by the "centrifugal force."

The *Fanal* recommends the Belgian government to order experiments to be made to test the comparative merits of the new modes of ventilation which are now proposed. The following are the different plans which seem to put forth claims to superiority; the Archimedes screw, Combes's ventilator, the ventilator of Cabaret, that of Latoret, and the steam jet of Pelletan. The question is, indeed, of sufficient importance to challenge the attention of any government that pays due consideration to the manufacturing industry of the country, and to the lives and health of the numerous body of men engaged in mining operations. A few thousands of pounds spent in encouraging new plans of ventilating mines, and in ascertaining experimentally their comparative merits, would probably lead to the adoption of effectual means for saving annually the lives of hundreds who are now killed by explosions, besides giving vigor and health to all who are debilitated, and whose lives are shortened by constantly breathing in an unwholesome and poisonous atmosphere.

STEAM ENGINE FURNACES.

"EXPERIMENTS ON THE ECONOMICAL EFFECTS OF FURNACES OF DIFFERENT CONSTRUCTION, AND ON DIFFERENT KINDS OF FUEL."

These experiments have been made by a committee appointed by the Society of Industry of the Grand Duchy of Hesse, and their object has been—

1st. To ascertain the useful and economical results of furnaces for boilers constructed on different principles.

2d. To establish the relative value of the combustibles most generally used in the country.

We do not consider it necessary to enter into the details of the experiment; we will only mention the results.

In order to decide the first question, a common boiler was set over a furnace of brick-work provided with a chimney, and this apparatus for heating was submitted to various modifications, as regarded the form and structure of the hearth as well as the disposition of the flues.

In order to resolve the second question, experimental trial was made of good dry wood chopped from the beach tree; of good coal from Reer, called *Fettschrot*; and of square pieces of turf from Greisheimer, perfectly dried, and of the heaviest kind.

The different modifications used in the construction of the furnace were the following:

I. Furnaces without flues or draught chimneys, the boiler being suspended freely above the fire.

II. A simple flue passing round the boiler, the bottom part of which only was immediately exposed to contact with the fire burning in the grate.

III. A double flue, that is, a flue going twice round the boiler in the same direction.

IV. A stove arched in the shape of a cupola, and having an opening in the middle of the arch, which became gradually wider towards the top, and by which the heat ascended, and was communicated to the bottom of the boiler, to be afterwards conveyed by three holes, placed at regular distances, into a circular passage which surrounded the boiler; to issue thence through three similar apertures differently arranged, and which communicated with a second passage placed higher, whence the draught was at length conducted into the chimney.

V. Two half flues, that is, each of which did not extend beyond half the circumference of the division of the boiler. The fore part of the flame (on the side next the door) ascended from the stove, and was distributed half into the flue on the right, half into the flue on the left, and was finally conducted into the chimney at the point where they met.

VI. Four half flues, or two on each side the boiler (from right to left); the flame issuing from the side opposite the door entered into the lower flue, then passed half the circumference of the partition of the boiler, and entered into the upper flue, whence it was finally conducted into the chimney.

The relative effects of these different arrangements have been ascertained, both with respect to the quantity of water evaporated in the boiler, as well as that of the combustible employed; particular care being taken to keep up the same level in the boiler after each experiment.

In the following table, which contains results of the experiments, the numerals indicate the different methods of construction of the furnaces in the order in which they have been described above; the figures placed underneath indicate the relative qualities of the combustibles employed to obtain a similar result; consequently the greater amounts indicate the worst methods of employing combustibles:—

Wood ..	VI	V	III	II	IV	I
	63	68·8	68·69	72·19	72·23	100
Turf....	VI	III	IV	V	II	I
	53	66	71	72	76	100
Coal....	III	VI	II	V	IV	I
	73	76	83	85	91	100

The following are the conclusions to be deduced from the foregoing table:—

1. The fire over which the boiler was placed without flues was attended with a less advantageous use of combustible than those with flues.

2. The utility of flues is much more perceptible in fires of wood or turf than in coal fires, because the result is a saving in fuel of about one-fourth to one-third with wood, and almost of one fourth to one-half with turf, and only of one tenth to one-fourth with coal, by the addition of flues.

3. The mode of construction with four half flues (No. VI.) may be considered to be generally the most advantageous. Next to this the construction with a double flue (No. III.), which in its mode of action bears the nearest resemblance to it. With respect to the arrangements Nos. II., IV., V., the effects they produce are nearly similar.

4. The double flue (No. III.), which surrounds the whole boiler, is attended with better results than the single flue (No. II.); according to the same principle four half flues (No. VI.) are attended with better results than two half flues (No. V.)

5. With the fire of wood and of turf, two half flues (No. V.) have more effect than a whole flue (No. II.), and four half flues (No. VI.) more than two whole flues (No. III.); in short, flues which encircle only half the boiler are in this case more effectual; while with a coal fire it is precisely the contrary. The cause of the difference is doubtless this, that in such combustibles as wood or turf, which blaze brightly, a retardation of the heated air, which in these half flues produces a sudden change in the direction of its motion, is more advantageous than with coal.

With respect to the calorific power of the different fuels, there results from equal weights of turf, 96; and of coal, 250; when that of wood is considered equal to 100.

The great difference that is found in combustibles, with respect to their natural quality and their composition, as well as in their degrees of dryness, can scarcely admit of forming points of comparison between these latter results and any other given case. It is well known that there are turfs which from an equal weight throw out more heat than wood; but the results with respect to the different methods of constructing furnaces are more to be depended on; because in these are remarked a degree of regularity in their effects, and it is easy to account for the causes on which the differences depend.—*Moniteur Industriel.*

CRIMINAL STATISTICS OF FRANCE.

The *Moniteur* publishes a report containing a statement of the administration of justice during the year 1839.

The Courts of Assize tried 5,621 defended cases. In 1837, they tried 5,873 cases, and 5,84[illegible] in 1838.

The 5,621 prosecutions are thus classed—1,597 for crimes committed against the person, and 4,024 for crimes against property. Of those 5,621 accused, 2,693 were found guilty, 1,598 acquitted and 1,330 were convicted with modifications, which

in 762 cases reduced the accusations to simple misdemeanors.

This report gives an average of one crime to 4,268 inhabitants. It varies in the different departments. Those which offer the smallest proportion are the Jura, where the average is found to be 1 crime to 15,017 inhabitants. The department of the Seine presents the greatest average of crime—viz., 1 to 1,203 inhabitants.

Of the 7,858 accused, there were 6,409 men and 1,449 women. This proportion, 18 out of 100, was exactly the same in 1838, and appears to be invariable. With respect to age, the accused are classed in the following manner:—78 were under 16 years of age; 1,227 from 16 to 21; 1,360 from 21 to 25; 1,453 from 25 to 30; 1,070 from 30 to 35; 880 from 35 to 40; 1,074 from 40 to 50; 484 from 50 to 60; 198 from 60 to 70; 41 from 70 to 80; and 3 above 80. Persons advanced in age commit proportionably less crime against property.

Amongst the 7,858 accused, 4,566 were unmarried, 2,918 were married, and 350 widows or widowers.

The degree of instruction possessed by the accused appears to exercise an influence upon their actions which it is important to state: 4,396 accused could neither read nor write; 2,549 imperfectly; 705 tolerably; and 207 had received a superior education.

The professional position of the accused is one of the most important points to examine. Amongst those tried in 1839, 1,100 lived in idleness; 4,523 labored for others; and 2,225 labored for their own account, either as heads of establishments, or lived on their incomes.

Out of 7,858 brought to trial in 1838, 5,063 were condemned—viz., 39 to death, 197 to hard labor for life, 852 to hard labor for different periods, 861 to solitary confinement, two to imprisonment, one to banishment, 3,081 to correctional punishment; 30 children under 16 years of age, acquitted as having acted without discernment, were sent to penitentiaries.

Of the 39 condemned to death, which is five less than in the year 1838, 21 were found guilty of murder, two of parricide, six of murder followed by robbery, three of infanticide, one of arson, five of sequestration.

The King's clemency prevented all the convicts from being executed; 13 had their sentence commuted to hard labor for life, three escaped the scaffold by suicide, another died before his execution.

According to the report, the motives which influenced the commission of the crimes of murder and arson are nearly the same each year. Out of 772 of those capital crimes, 113 were induced by cupidity, 43 were caused by adultery, 94 by domestic dissensions, 19 by the passion of love, 41 by debauchery, 243 by hatred and desire of vengeance, and 88 the result of gambling and drinking.

Of the accused who were tried by the Courts of Assize in 1839, 1,749 had been already convicted, which is 14 less than in the year 1838.

Amongst those 1,749, 1,096 had been condemned but once, 396 had been convicted twice, 166 three times, 69 four times, 39 five times, 43 from six to ten times.

Amongst those persons arrested were found 1,070 foreigners, viz., 280 Sardinians, 205 Belgians, 131 Swiss, 127 Austrians, 58 Dutch, 55 Prussians, 36 Spaniards, 28 Russians, and 27 Englishmen.

The report enumerates 6,632 accidental deaths, 2,993 by drowning, 598 crushed by carriages, 579 by falling down precipices, and 230 have fallen victims to the immoderate use of spirituous liquors. The report states that the number of suicides increases each year. In the year 1839 they amounted to [illegible]747, being 161 more than in 1838, 304 more than in 1837, and 407 more than in 1836. The department of the Seine figures for 486, nearly one-sixth of the entire.

[illegible] females are returned amongst the suicides. Each period of life, from infancy to old age, has paid its tribute to this malady. There are 2 children of from 8 to 9 years of age, 2 of 11, 1 of 12, 2 of 13, 3 of 14, 9 of 15, 147 of 16 to 21, 335 of 60, 189 of 70, and 41 of 80.

The means most frequently used to destroy life are submersion and strangulation. 958 individuals drowned themselves, 816 hung themselves, 189 suffocated themselves with the fumes of charcoal, which appears to be the principal mode resorted to by the Parisians.

AMENDMENT OF A SPECIFICATION.

The Lord Chancellor gave judgment on Saturday, in the case of Mr. Nickells, the arguments in which were noticed last week. The patentee desired a patent for covering fibres in the making of braid. By a mistake in the office of the Secretary for the Home Department the invention was described as one for "re-covering" instead of "covering" fibrous substances. An action having been brought for an infringement, it was sought to correct the mistake by an application to the Master of the Rolls, who made the alteration, and the Caoutchouc Company appealed against the order.

The Lord Chancellor, in giving judgment, observed, that the object of the enrolment of a patent was to protect the Crown, and through it to protect the public from any imposition, for as the letters patent were in the possession of the party obtaining them, they could at any time be falsified so as to be made to contain more than the Crown had granted to the holder. Against any abuse of that kind the enrolment was provided as a check. The act of Elizabeth made the enrolment evidence of the objects of the patent, so that if it was lost or destroyed, the enrolment could be produced by the patentee. It was therefore the duty of the court to ascertain that the enrolment corresponded exactly with the patent, and it could not authorise a single word to be substituted for another word in that document without knowing what was the word in the patent. In the present case the patentee might have applied to the Lord Chancellor in the first instance, in order to correct what he alleged to be a mistake; but he had preferred to go to the Master of the Rolls, and get the alteration made in the enrolment, without producing the patent. That was a practice to which the court could not give its sanction, but his lordship would still leave Mr. Nickeals at liberty to apply to the Great Seal to re-seal the patent, if he was so advised. His lordship, therefore, made no order at present, although he certainly could not allow the order of the Master of the Rolls to stand. The Master of the Rolls, with whom his lordship had communicated on the subject, agreed with his lordship on the course that ought now to be adopted.

BRITISH PATENTS.

ENGLISH EXPIRED PATENTS.

Malcolm Muir, of Glasgow, for *machinery for preparing boards for flooring, and other similar purposes*, June 1.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 358.)

James Robinson, of the Old Jewry, manufacturer of machinery, for *a sugar-cane mill of a new construction, and certain improvements applicable to sugar-cane mills generally, and certain improvements in apparatus for making sugar* (being a communication), June 2.—Claim first.—The mode of constructing sugar-cane mills, whereby the sugar canes in passing shall be pressed at least three times; and the rollers tied with malleable iron straps, as herein described.

In this improvement three small rollers are arranged round the under part of the periphery of the main or top roller, and are caused to revolve by a cog-wheel, fastened on one end of the main roller, and taking into three smaller cog-wheels, one at the end of each of the smaller rollers, so that the cane in passing through the mill is subjected to three distinct pressures, whereby the juice will be more thoroughly expressed than it is in the ordinary mill, in which the cane undergoes only two pressures. Instead of the above arrangement, three pair of rollers may be used for the same purpose; in which case the bearings of the axes of each pair of rollers are tied together with malleable iron straps, thereby relieving the framing of a great part of the strain to which it would otherwise be subject. The juice at each pressing is thrown backwards from the canes in the opposite direction from the motion of the rollers, instead of passing onwards with the canes, as in the common mill.

Claim second.—The application of hot water or steam to sugar-canes as they are passing through sugar-cane mills.

Just before the last pair of rollers a pipe is placed, perforated with a number of small holes, through which jets of hot water or steam are applied to the crushed canes before they pass through the pair of rollers, in order to facilitate the expression of the juice.

Claim third.—The means of feeding sugar-canes into sugar-cane mills of any construction, as herein described.

The canes are first put on an inclined plane or table, from whence they are raked on to an endless band, extended between two rollers by which motion is communicated to it, being supported along its upper part by a number of smaller rollers, and the canes being gradually carried by the band to the mill, time is allowed for spreading them evenly. Before reaching the mill the canes pass under a small roller, the bearings of the axis of which are capable of rising and falling in slots formed in the framing, so that if too much cane passes under it the bearings will rise, and by means of connecting-rods cut off the steam from the engine that drives the machinery, and so stop the mill; the like effect is produced when the attendant neglects to supply the canes.

Claim fourth.—The mode of constructing the driving wheels of sugar-cane mills.

The driving wheel has a groove in its periphery, and is also provided with several set screws passing through the same. Round the wheel is a toothed ring, having a corresponding groove formed in the inside of it, and within these grooves friction brasses are placed, which being pressed into the groove in the toothed ring, by the set screws, prevent the ring from coming off the wheel, and in proportion as the set screws force the friction brasses against the inner surface of the ring, so will be the friction holding of the ring with the wheel.

The driving wheel thus constructed will go on driving the mill so long as the strain is not greater than the friction, but if from overfeeding of the sugar cane, a greater strain is brought in the machinery than it is intended to bear, the toothed ring will slide round on the friction brasses, and thus prevent any injury being done.

Claim fifth.—The mode of casting the rollers of sugar-cane mills with necks or axes.

The rollers with the necks or axes are cast in one piece, in place of being cast separately as usual.

Claim sixth.—The mode of forming a rim round a set or series of sugar pans, by casting part of such rim round each pan.

In fixing pans of the ordinary construction, it is necessary to form a rim of lead or copper round the set of pans, whereas in this improvement a portion of the outer rim is cast on each pan, so that on the pans being joined together by screws, those portions will form the entire rim, at the same time the syrup is permitted to boil over from one pan to another, at the junctions of every two pans, over the usual rims of the same.

Claim seventh.—The mode of setting sugar pans with flat bottoms.

Under each pan a shield of brickwork is formed,

by means of which the boiling liquid above the shielded parts will be comparatively quiet, and the scum arising from the liquid will collect there, and may be readily removed.

Claim eighth.—The application of iron pans tinned, or coated with tin, or alloys thereof.

The sugar pans are either formed of plates of iron, tinned before being made into a pan, or when of cast iron, the tin is applied to the inner surfaces of the pans after they have been cast.

HUGH GRAHAM, of Bridport-place, Hoxton, Middlesex, artisan, for *an improved manufacture of that kind of carpeting usually denominated Kidderminster carpeting*, June 2 —Claim.—The improved manufacture of that kind of carpeting usually denominated Kidderminster carpeting with weft threads dyed as herein described.

The yarn or weft is first scoured in the usual way, then dried, wound on bobbins, and reeled on an ordinary traversing reel, the circumference of which should be rather more than twice the width of the carpet intended to be woven to allow for the turns. The skeins of yarn are then placed upon small dyeing poles, each skein being tied immediately under the pole to prevent its shifting from its position; after which they are placed upon the dyeing vessel, and the lower end of the skein dyed to any length required. The centres of the skeins are now placed between two pieces of wood fastened firmly together with clasps, and hung upon the dyeing poles with their dyed ends upwards; they are then removed to another vessel, and their lower ends dyed another color. This process may be repeated as many times as required, in order to die the same skein with a variety of colors.

The skeins being now washed and dried, are ready for use, and are made into carpets in the ordinary way.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page* 358.)

HENRY BRIDGE COWELL, of Lower-street, St. Mary's, Islington, Middlesex, ironmonger, for *improvements in taps, to be used for or in the manner of stopcocks, for the purpose of drawing off and stopping the flow of fluids*, June 2.—The first part of this invention consists in applying a moveable stopper to the spout of a tap, such stopper being suspended at the lower ends of two upright connecting links, one at each side of the spout, which links pass down through holes or sockets in the metal of the head of the tap. The upper ends of these links are connected to a piece of metal or collar, situated above the head, and fitted around a screw that turns in the same, so that on the screw being turned it will either rise or fall, and consequently raise or lower the stopper, thereby opening or shutting the spout of the tap. The fluid which escapes round the sides of the orifice of the spout on the stopper being lowered will be collected in the hollow mouth of the tap, so as to run out in a compact stream from the lower orifice.

The second part of this invention consists in applying to a ball-cock (similar in its parts to the tap just described) a second ball and lever, provided with a click or detent, having a tooth, which catches into a notch or notches cut in the circumference of an enlarged head on the end of the screw before mentioned. The click is mounted on a centre pin fixed in the collar of the screw, so that whenever the other ball descends the tooth catches into one of the notches, and turns back the screw, thereby opening the passage through the cock for the water. The usual ball is kept submerged during the flowing in of the water into the cistern, by means of the click preventing the screw to which it is attached from being turned; but when the surface of the water reaches the second ball, and raises the same upwards, the click will be lifted up about its centre of motion, so as to disengage its tooth from the notch in the head of the screw, whereupon the other ball will immediately rise to the top of the water by its power of floatation, and close the passage of the cock.

The third part of this invention consists of another kind of tap, similar in some respects to the one first described.

The moveable stopper is fitted in the manner of a piston into the cylindrical hollow of the head of the tap, so as to move up and down therein by the action of a screw working in a cap that surmounts the head of the tap; by turning this screw round the stopper is pressed down on the upper orifice of the water-passage of the spout, and at the same time over the annular orifice of a circular channel formed within the head of the tap, and passing round the water passage, through which channel the water is conveyed to the passage. Thus on depressing the stopper the flow of water will be stopped, but on raising the same the water will be permitted to flow again.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page* 359.)

MILES BERRY, 66, Chancery-lane, Middlesex, patent agent, for *certain improvements in looms for weaving* (being a communication), May 27.—These improvements are shown applied to looms for weaving carpets, but are not confined to the same.

One of the improvements consists in a peculiar arrangement of the Jacquard machine, whereby one trap-board is made to descend, whilst the other rises, and the weight of the harness on the ascending trap-board is made to counteract the weight of the harness on the descending trap-board, thereby equalising the power required to drive the loom.

The trap-boards are perforated with holes in the usual way, and are supported by guide-rods, which are guided by stands bolted to the framing of the loom, and are connected by connecting-bars with vibrating levers.

The journals are placed at the top of the Jacquard machine, being fastened to guide-rods, which are connected by vibrating levers by means of connecting bars; these vibrating levers, as well as those first mentioned, are worked by cams, by means of which the trap-boards and journals are moved up and down alternately.

An improvement is likewise shown in the machinery employed for delivering the warp and taking up the finished cloth.

Another of the improvements consists in a mode of constructing the shuttle and shuttle-boxes, and of connecting the said boxes to the framing of the machine, instead of attaching them to the lathe, as heretofore done.

The shuttle is made of a plate of iron or other metal with a projection at each end, from each of which projections a round pin extends, pointed at its end, and having a notch filed in its top side, and on the top of the projections are feathers or guide-pins, the use of which will be described hereafter; the shuttle is likewise provided with the ordinary pin for holding the bobbin, having a spring to secure the bobbin to it.

The shuttle-boxes are formed of tables or plates of iron, with a pin turned up at right angles on one edge, by which they are secured to arms affixed to suitable fulcrum shafts; they are provided with bars to guide the shuttle, and springs to secure it in the shuttle-boxes, and also with a pin to arrest the shuttle when it enters the box. The shuttle-boxes are formed in pairs, and are raised or lowered by suitable mechanism, when a change of filling or woof is required.

The shuttle is passed or handed through the warp by means of reciprocating arms, instead of throwing it by a sudden impulse of the machinery, as usual. The ends of the arms are cylindrical, and have a hole bored in them to receive the round pins of the shuttle, which are held in the arms by a catch taking into the notch in the top of the pin; the feathers or guide-pins above mentioned are received in grooves in the arms, and keep the shuttle from turning. The mode of passing the shuttle is as follows:—The shuttle being attached to one of the arms by its pin, is passed by that arm through the warp half-way across the loom, it is there met by the other arm, to which it becomes attached by its pin entering the hole in the end of it, at the same time it is released from the first-named arm by the action of the machinery, and is carried the remainder of the distance across the loom by the arm to which it is then attached.

Another improvement consists of an apparatus for stopping the loom, when the filling breaks or is exhausted; and also for preventing the selvage of the cloth from drawing in, when the filling is prevented by any cause from escaping freely from the shuttle.

The apparatus for stopping the loom when the filling breaks or is exhausted consists of a cam acting on a vibrating rod, which rod, when the filling breaks, turns a horizontal shaft, and withdraws a short arm projecting from the same out of a groove formed in a rod attached to the top of a vertical shaft; this shaft, on the rod being released, is caused by its spring to disengage a clutch on the main-shaft, from a clutch-holder, also on the same, and to throw the loom out of gear.

The mode of preventing the selvage of the cloth from drawing in, when the filling is obstructed in its delivery from the shuttle, is as follows:—At that stage of the operation of the loom when the lathe is falling backwards, the warp opening, and the shuttle about to start, the points of two wire hooks are raised up forward of the filling, so that when the shuttle passes the filling which it carries draws round the point of the hook, which is at that side of the loom from which the shuttle is taken, and also draws the hook towards the selvage of the cloth, until an arm affixed to a vertical axis which supports the hook strikes against a stand, and prevents the further approach of the hook, thereby preventing the filling from drawing in the selvage of the cloth when it is obstructed in its delivery from the shuttle.

JOHN CLAY, of Cottingham, Yorkshire, gent., and FREDERICK ROSENBORG, of Sculcoates, Yorkshire, gent., for *improvements in arranging and setting up types for printing*, May 27.—A fount of types is provided of upper and lower case, which types are arranged in a series of perpendicular grooves, formed in two vertical plates fixed at the top of the machine, all the types of one letter being arranged in the same groove one above another. The selection of the types is effected, in order to form them into words and sentences, by the compositor passing his fingers over a series of keys placed at the lower part of the front of the machine. On one of the keys being depressed, it causes a horizontal rod to force the required type through an opening at the lower part of the groove on to a horizontal plane, along which it is carried by a conductor to a receiver at the end of the same. It is there received on a moveable supporter, which, as the types are placed on it one above another gradually descends, until a line is formed, it is then on a level with the bottom of the receiver, being separated from the same by a sliding fork, which supports one side of the line during its formation. The sliding fork is now removed, and the line of types advanced, a distance equal to their width, along a horizontal bar placed on the bottom of the receiver, which serves the purpose of a composing stick; the types are then supported on one side by an upright piece sliding in a dovetail-groove in the horizontal bar just named, and receding as the successive lines of types are formed and advanced along the receiver, and on the other side by the sliding fork, which has been returned to its place. Another line of types is now formed and advanced into the receiver in the same manner, and the process is continued until the desired number of lines are set up; they are then removed from the receiver upon the horizontal bar.

GEORGE H[illegible]WORTHY PALMER, of Surrey-square, Surrey, civil [illegible]neer, and CHARLES PERKINS, of Mark-lane, Lon[illegible]n, merchant, for *improved constructions of pistons and valves, for retaining and discharging liquids, gases, and steam*, May 28.—The first

part of this invention consists of an improved piston, which may be likewise used as a valve. It is composed of an elliptic plate of metal, the minor diameter of which is the same as the inner diameter of the barrel or cylinder in which it works, but its major diameter is one-fourth larger. On the major diameter near its centre is an adjustable knuckle or joint, to which the piston rod is secured by any suitable means, so as to admit of the piston swinging or adjusting itself freely in the direction of its major diameter, thereby enabling it to come into close contact with, or to "bed" itself at its periphery upon its "seat," viz., the barrel or cylinder in which it works.

If it is intended to be used as a valve, the knuckle or joint is removed, and it is screwed to an axis placed directly across its major diameter near its centre, and turning in bearings in the sides of the barrel or cylinder.

The second part of this invention consists of a double adjusting balancing valve.

It consists of a plate having two openings in it, one of which is closed by a valve beneath the plate, and the other by a valve above it; the valves are connected together by a bent arm, turning upon an axis placed mid-way between the two openings, so that on one valve being opened the other is opened also, and on one being closed the other is closed likewise.

The patentees claim the right of making or constructing the elliptic pistons or valves, of any one or more materials, in one or more pieces, and with any auxiliary precautions to ensure their action under different applications, and also their application and use to various purposes. And, as regards the double adjusting balancing valve, they claim the right of making, constructing, or forming the same, of any one or more suitable materials, or of one or more pieces, and the application and use of them, under different modifications, to steam-boilers, steam-engines, pumps, &c., or other purposes to which they may be applied.

John Buchanan, of Glasgow, coach-builder, for *certain improvements in wheel carriages, whether for common roads or railways*, May 28.—The first part of this invention consists in an improved construction of the carriages of four-wheeled vehicles.

It is applied to a chariot as follows:—A longitudinal bar or perch extends beneath the body of the carriage, one end of it being firmly fixed to the boot, and the other end of it pivoted to a cross-bar (placed behind that cross-bar to which the hind axle is attached) by a pivot bolt. To the front cross-bar one end of an iron bar is firmly fixed, the centre of the bar being supported by a cross stay; the other end is formed into a pin or rod, working in a box or open socket attached to a keeper by a pivot bolt, which allows the box to revolve, so as always to be at right angles to the pin.

A piece of wood is attached to the bottom of the body for the perch to traverse upon, and the keeper just mentioned being also attached to the bottom of the body, serves to retain the perch in contact with the piece of wood. A similar keeper is attached to the hind cross-bar, between which keeper and the cross-bar the perch works.

When the leverage of the pole is applied to turn the under fore-carriage, with the fore-axle and its pair of wheels, round the perch bolt in the usual manner, it acts upon the body by means of the pin or rod working in the socket, and causes the upper fore-carriage and the body to move away from each other in contrary directions, laterally, thereby moving the body out of the way of the fore-wheel on the inside of the circle in which the carriage is turning.

The second part consists in an improved mode of applying cross-springs to wheel carriages, by which the use of side springs and a connecting perch is rendered unnecessary.

This improvement is shown applied to a two-wheeled carriage.

The spring is suspended from the axle by the middle, a block of wood being placed between it and the axle, and each end of the spring is connected by a shackle with the ends of two scroll irons below it, the other ends of which are attached to the shaft.

The third part consists of an improved spring for wheel carriages.

It is composed of two or more plates of steel or other suitable material, kept from contact with each other by a block or blocks of wood in the middle of their lengths, and connected at the ends to each other by loose links, shackles, or rollers.

The fourth part consists of an improved gearing for connecting railway carriages to each other, so as to maintain by the action of the buffer rods a uniform degree of tension throughout the train, whether in traction or propulsion.

One end of a rope is attached to the axle guard, from thence it passes through a block, and round a pulley contained in the same, and is brought back to the buffer rod, to the inner end of which it is attached by a hook. The block just mentioned is attached by a right and left handed screw to the corresponding block of the next carriage, and the screw is turned until the rope is drawn tight, and the buffers of the carriages bear upon each other. The action of the buffer rods will at all times take up the slack of the rope, and thus maintain a uniform degree of tension throughout the train. Instead of a rope, a chain or flexible band may be used.

The fifth part is an improved mode of applying braces to the springs of wheeled carriages.

It consists in attaching the brace to the frame of the carriage behind the spring, at such an angle as to support the same, and to obtain the necessary degree of "draw" on the brace, without the aid of the heel-flap or stag.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 14th of August.

Francis Sleddon, jun., of Preston, machine-maker, due Aug. 2.

William Ward Andrews, of Wolverhampton, ironmonger, due Aug. 2.

Thomas Young, of Queen-street, London, merchant, due Aug. 3.

William Hancock, jun., of King-square, Middlesex, accountant, due Aug. 3.

Joseph Bunnett, of Deptford, engineer, due Aug. 3.

John Cartwright, of Loughborough, manufacturer, Harry Warner, of the same place, manufacturer, and Joseph Haywood, of the same place, framesmith, due Aug. 4.

Thomas Griffiths, of Birmingham, tin-plate-worker, due Aug. 8.

Thomas Thorburn, of Manchester, machinist, due Aug. 8.

William Ryder, of Bolton, roller and spindle-maker, due Aug. 8.

Thomas Fuller, of Salford, machine-maker, due Aug. 8.

Elisha Holdham, of Cricklade, Wilts, railroad-contractor, due Aug. 8.

Charles Green, of Birmingham, gold-plater, due Aug. 8.

William Wigston, of Salford, engineer, due Aug. 8.

John Stott, of Great Bowden, Market Harborough, timber-merchant, due Aug. 8.

James Johnston, Esq., of Willow Park, Greenwich, due Aug. 8.

William Henry Fox Talbot, Esq., of Locock Abbey, Wilts, due Aug. 8.

FOREIGN INTELLIGENCE.

FRANCE.

PERIL TO INVENTORS IN FRANCE.

The following account of the reception which the inventor of a new implement of war met with on his landing in France may serve as a caution to English inventors ere they proceed to offer the products of their ingenuity for approval in France. The account is given in the *Gazette des Tribunaux*, under the date of Boulogne, June 4th. "The day before yesterday, the packet from London came into port about nine o'clock at night, having on board 80 passengers. The last carried a kind of straw hand basket, the inside of which, having been cautiously examined, was found to contain, enveloped with much care, a sort of infernal machine, a six-barrelled pistol, the model of a fort, some powder, some balls, and a few detonating caps adapted to the use of these fire-arms. The articles were seized and forwarded to the Procureur du Roi, and the individual in whose possession they were found was apprehended and incarcerated. The Procureur du Roi and his deputy immediately commenced an investigation of the affair, and the passenger was subjected to a long and minute examination, in the course of which only this transpired:—The prisoner says his name is Israel Levy Lillycrass, armourer, at Bridgewater. He invented the machine and the pistol, and completed them last February; was now on his road to Paris, with the intention of offering the deadly weapons for sale to the French Government. He appears aged about twenty-five or twenty-six, and is dressed like, and has the gait of a working man. Only two shillings were found upon his person. This is a description of the machine and the pistol. The former is composed of an iron plate, from eight to nine centimetres long by six wide. One side is bound with wood, and upon the other, opposite, are fixed fifteen barrels, five in a row, which are discharged by means of three detonating gun hammers, the trigger of which is very nice. The plate which supports the barrels is a little hollowed, and, to fire it, it must be placed against the breast, after suspending it about the neck by a brace. The barrels are very short, and may be easily concealed under a loose dress. They are so pointed as to form a circle of fire. The six barrels of the pistol are placed one above the other, in pairs, and are fired by means of two hammers, being placed so that the fire may cross."

THE ARTESIAN WELL OF GRENELLE.

On the 29th ult., about noon, the water of the well of the abattoir of Grenelle almost ceased to flow. A great sensation was excited among the persons connected with this abattoir, on account of the absence of Messrs. Mulot, sen. and his son. It was feared that the water would never flow again. Yet an hour afterwards it re appeared as abundantly as usual; but it was mixed with large particles of green sand, then with small sand, and at length with an immense quantity of hard, concrete, green clay. There is nothing surprising in this occurrence, every Artesian-well has been subject to it: it is occasioned by the collection of sand and clay drawn by the force of the stream, which must exert the power of 50 atmospheres to raise the water from a depth of 547 metres, or about 1,700 feet. It is probable that the same thing will occur again until the earth at the bottom of the well is consolidated. The pipes which are about to be put down immediately, will partly tend to prevent the recurrence of the stoppage; this at least is the opinion of scientific men.

HAIL AND THUNDER STORM.

The Canton of Pouliguen, in the Loire Inferieure, was on the 31st ult. visited by a tremendous storm, which covered the lands with hailstones, some of which are said to have been as large as pullets' eggs. The College at Guerands had 400

panes of glass broken, and the total number destroyed in the town is estimated at 4,000. One of the painted windows of the church, representing the different scenes of the Passion, and which was one of the finest specimens of the middle age, was entirely destroyed. All the country round was severely damaged. At St. Brieuc the lightning was terrific. At Diuan the electric fluid struck some poplars, dispersing the branches in all directions, some to the distance of more than 30 yards. The ground at the foot of one of the trees was trenched as if the plough had been used, and yet a man who had taken shelter under the trees with some horses escaped without injury, though dreadfully alarmed. It is remarkable that neither the trees nor the scattered branches showed any sign of having been burnt, but merely of violent fracture.

The reception of M. Victor Hugo as a member of the *Academie Français*, in the seat rendered vacant by the death of M. Nepomucene Lemercier, took place on Friday, in presence of a numerous and brilliant auditory. The sitting commenced at two o'clock, and immediately afterwards M. Victor Hugo pronounced his inaugural address, of which the basis was a notice of the academician whom he has succeeded, both in a literary and political point of view; the latter, however, predominated. Amongst the distinguished personages present were their Royal Highnesses the Duke and Duchess d'Orleans, the Duchess de Nemours, and Princess Clementine.—*Galignani's Messenger.*

The *Constitutionnel* contains a long article on the cod fisheries of France, which embraces some curious and interesting details. It appears from that document that there are 400 vessels employed in that branch of industry, measuring 50,000 tons, and manned by 11,000 first-rate seamen; but it shows that in 1793 the mercantile navy of France was more considerable than at the present day. At the former period the seamen employed in it amounted to 100,000, that in the year the number had fallen off to 83,000, and that at the present time they were only 98,000.

BELGIUM.

PATENTS OF INVENTION IN BELGIUM.

By a recent decree of King Leopold, there has been appointed a consulting committee attached to the department of the Minister of the Interior, for affairs relative to industry in general, and especially to those relating to patents of invention and importation. This committee is instructed to make a detailed report on every subject referred to them by the minister. It is ordered, that when a petition for a patent is sent to the committee, they shall report upon it as soon as possible, and shall state in their report, in the first place, whether the specification, or description, is sufficiently clear, methodical and regular, so that by its aid alone an artisan may acquire a sufficient knowledge of the invention to be enabled to construct the article; secondly, whether or not the invention he already known and put into operation in the kingdom by any other than the petitioner, and whether it has not been already patented in Belgium; thirdly, whether the invention is dangerous in its application; and fourthly, whether the grant of the patent will be prejudicial to the general interests of the country and of manufacturing industry. The considerations which are stated to have induced the King to pass this decree are, "that the petitions and grants of patents of invention, improvement, and importation have become more and more numerous, and that it is requisite for the interest of manufacturing industry that these petitions, as well as the questions relating to them, should be examined with all possible care and promptitude; and that business relating to manufactures, the amount of which is daily increasing, requires the constant consideration of men who possess particular acquaintance with science as applied to the arts."

The hot weather at the end of last month increased the difficulty of ventilating the mines, and caused great apprehension of some fatal explosion in the coal-pits of the coal basin of Liége. On the 26th ult., the fresh air circulated so slowly through the galleries of the mine of the six barriers at Seraign, that the workmen, warned by their safety lamps, ceased working in order to avoid an explosion.

M. Dierecky, a paper manufacturer, of Ghent, has discovered that the refuse ends of asparagus make excellent paper, at half the expense of paper from rags, and that a still greater economy is obtained by mixing the pulp of asparagus with that of the beet-root.

The cotton mills of M. Hemptienn, at Ghent, have been destroyed by fire. The loss is estimated at about 100,000 frs.

It was lately stated in the *Gazette de Cologne*, that the establishment of the late Mr. Cockerill, of Seraign, had been purchased by some speculators at Vienna, and that the materials were being conveyed to that city. It appears, however, that this is a mistake. The manufactory at Seraign continues actively at work, and the origin of the report was that a quantity of machinery has been lately made there on account of some manufacturers at Vienna, which was forwarded by way of Cologne.

RAILWAY INTELLIGENCE,

DOMESTIC AND FOREIGN.

Railway Traffic, &c.—The particulars of traffic upon the various railroads in England and Scotland, 29 in number, for the last week, that is to say, up to the date to which the respective returns are made, show the following results:—The total receipts were £74,428, of which there were £60,961 for passengers, parcels, carriages, horses and mails, and £13,466 for merchandise. The London and Birmingham Railway took £17,396; Great Western, £8,630; South Western, £7,005; Grand Junction, £7,884; Liverpool and Manchester, £4,340; Manchester and Leeds, £3,225; Midland Counties, £2,625; North Midland, £3,702; London and Greenwich, £2,284; York and North Midland, £1,368, &c.

Openings of Railways in the West of England.—The present week has witnessed a great movement of the railway system in the West of England. On Monday last, agreeably to announcement, the Great Western Railway was further opened up to Chippenham, which is only 13 miles distant from Bath; and on the same day the Cheltenham branch was opened as far as Cirencester, 15 miles from Cheltenham. Seven trains each way have since commenced running daily between London and Bristol (excepting only the distance between Chippenham and Bath, which for a few weeks longer must be performed by horse power) and London and Cirencester. Bristol, once a long day's journey from the metropolis, can now be reached by the fast trains within five hours; Cheltenham in about the same time. The Bristol and Exeter Railway, which is destined to extend the chain of communication still further westward, is also as far as Bridgewater, a distance of 32½ miles, nearly quite ready for public traffic. On Tuesday the directors and a large body of the proprietors took an experimental trip to Bridgewater, and the line was everywhere found to be in a most excellent working condition. The only thing which stops the opening to the public for a few days longer is the completion of the necessary arrangements for the intercommunication with the Great Western at Temple Meads (Bristol.) We are glad to learn that the immense benefits which these ramifications of the railway system are about to confer on the western counties begin to be fully appreciated by the inhabitants. "It seems," says a correspondent, who accompanied the opening train to Chippenham, and also the experimental train to Bridgewater, "as if a whole people had turned out to give joyous and grateful welcome to some hero of a hundred fights, or other equally great national benefactor. Nothing could be more gratifying or satisfactory than the reception which we every where experienced."—*Railway Times, June 5.*

Great Western Locomotives.—We understand that Messrs. George and John Rennie have sent a locomotive, the *Mazeppa*, on the Great Western Railway, which seems to contain a great improvement in its heating powers. On Wednesday it took a load of thirteen carriages between London and Chippenham, a distance of 93 miles, in three hours 43 minutes, or in three hours' travelling time, exclusive of stoppages, that is at the rate of 31 miles per hour, and consumed only 30 to 34 lbs. of coke per mile. Some of the other engines, we are informed, use 60 to 64 lbs., and the average is estimated at about 40 lbs. The saving, therefore, if the Rennie consumption should continue, is about 14 per cent., no insignificant item in the half-yearly account.—*Railway Magazine.*

Railway from Lancaster to the North.—Col. Graham and a deputation of gentlemen from Scotland have proceeded to Lancaster for the purpose of setting measures on foot to accomplish the line between Lancaster and Glasgow, recommended by the Government commissioners. The railway companies between Birmingham and Lancaster are alive to the importance of this work, and are ready to lend a helping hand, so that we may expect shortly to see a decisive and effective step taken.—*Lancaster Guardian.*

Eastern Counties Railway.—On Tuesday, a special general meeting of the proprietors of the Eastern Counties Railway Company was held at the Company's Station, High-street, Shoreditch, to authorise the directors to raise, by loan, the sum of £100,000 under the new Act of Parliament, and to authorise them to issue debentures or other securities for the money so raised. A resolution authorising the directors to borrow the money required was agreed to unanimously. The report stated, that though the Act of Parliament empowered the company to raise £300,000 by the issue of new shares, the directors were of opinion there would be no necessity to call on the proprietors to invest them with authority for that purpose. The works of the Eastern Counties Railway in the neighborhood of Chelmsford are steadily going on. The cutting on the Springfield side of the town proceeds rapidly, and the gigantic embankment is steadily striding on towards New-street, in which street the workmen have commenced the construction of the bridge. The brickmakers are very active in the Town Field, and have commenced burning a very large number of bricks. At Widford the cutting is forward, but between that point and New-street, Chelmsford, there is an immense mass of labor to be performed. The contractors are also at work at Hatfield Peverel and Colchester. After the meeting of shareholders in London on Tuesday, a party of the directors went down to Brentwood, and opened the new road down to Bull Road. It is an excellent piece of work, and when it is brought into general use will do away with the hill at the bottom of the town. In the cutting the workmen have got through the crown of the hill.—*Essex Standard.*

The Northern and Eastern Railway is expected to be opened to Harlow in July; and arrangements are being made to run all the coaches from Cambridge to the railway station.—*Chelmsford Chronicle*

Railway Trip.—On Tuesday, the inhabitants of Sheffield were generally on the *qui vive* to witness the departure of the special train on the North Midland Railway, from Sheffield to Derby. There were forty-seven carriages and five engines, containing about one thousand persons. The departure took place at 9: 30 A.M., and arrived at Derby

at a quarter past twelve. The train was again despatched at half-past six o'clock from Derby, and arrived in Sheffield at about ten minutes before nine, without any accident occurring, save a few hats being blown off, and an individual falling out of a carriage when it arrived at Sheffield, from the foolish practice of rising from the seat before the carriages are finally stopped —We understand that our esteemed townsman, John Wilson, Esq., gave the men employed in his manufactory a trip, furnishing them also with tho means of enjoying themselves when there. A similar liberal treat was also conferred on their clerks and men, by Messrs. Wilson, Hawksworth, and Moss. Our liberal townsmen, Messrs. Turton aud Sons, file manufacturers, set an example worthy of imitation, by treating 60 of their most deserving workmen with second class tickets.—*Sheffield Iris.*

Another Railway Trip.—The directors of the Great North of England Railway afforded a treat of no ordinary character to the inhabitants of Hartlepool, Stockton, Shildon, Darlington, and other towns in the neighbourhood, hy granting them an excursion trip to York and hack, on Tuesday last, for 5*s*. The great number of people availing themselves of the treat was a sufficient proof of their offer being duly appreciated. The trains were materially lengthened on the arrival at the several stations on the line, and, with their loads of cheerful and happy visitors to old Ebor, proceeded at a rapid rate.—*Sheffield Iris.*

Railways in Scotland.—At the recent spring meeting of the Commissioners of Supply for Perthshire, Sir John S. Richardsou of Pittfour introduced the subject of the contemplated main line of railway from London to the North of Scotland. That line had been fixed under the sanction of Government, so far as Edinburgh, and means were now in progress for its continuance the length of Perth. The Northern Counties were also engaged in the preliminaries neeessary for its extension as far as Inverness, and Sir John considered this eounty had a great and direct interest in co-operating with them for that object. He concluded by moving " that the county of Perth agree to join the town council of Inverness, in their application to Government for a survey of the best trunk line of railway communication to the North of Scotland, in connection with the great line from London to Scotland. The resolution was unanimously adopted. Mr. Smith, of Deanston Works, thought this a proper opportunity to mention as to the progress of the junction line from the Edinburgh and Glasgow Railway to Stirling. He was happy to say that the matter was in a forward state, and that the flying survey from Stirling northward to Perth was also well advanced, and that, so far, the opinion of the engiueers was highly satisfactory regarding the practicability of the uudertaking, and the facilities the district presented for the formation of a railway.—*Dundee Courier.*

RAILWAY ACCIDENTS.

Fatal Accident on the Sheffield and Rotherham Railway.—On Thursday evening the half-past seven o'clock train on the Sheffield and Rotherham Railway (which meets the Derby six o'clock train at Masborough on its route to Leeds) met with a serious accident. The engineer had placed the tender before his engine, and was proceeding on his way with a heavy load, when the axletrce of the tender broke, and thus stopped its progress. The engine ran with a dreadful crash over the disabled tender, dragging after it one of the carriages. It was of course thrown off the rails, and was ultimately upset in an adjoining field. The engineer was found under the engine, which was overturned; he was dreadfully bruised and scalded, and was conveyed to the Sheffield Infirmary, where he died the following morning. The stoker was also killed. A female, who was the only passenger in the carriage next to the engine, was seriously injured. An inquest was held on the bodies on Saturday. Samuel Pritchard, tho station master at the Sheffield station, deposed—" I saw all was right before the train started, and both the men were perfectly sober. The tender was placed before the engine, in consequence of the turntables not being in proper order to turn the engine, and undergoing some alterations. The train went off in the usual manner. Bates was 28 years of age. I do not know the age of Richardson. The train has been in the habit of starting with the tender before the engiue for about three months. Bates has beeu an engine-driver for some time, and understood his business perfectly, and was very careful. *There is no guard to that train, nor any breaks to the carriages.* I have not considered it so safe for the tender to be before the engine. I should say so because of the pressure of the engine from behind. There was no means by which the engine could be turned at the Sheffield station. Every exertion has been made by the company to get the tables properly finished. We have now managed to get the carriages turned, but only temporarily. I cannot say whether the tender going first contributed to the cause of the accident." The jury returned a verdict, that "John Richardson and James Bates came to their deaths from accidental causes, owing to a defect in the axle of the tender; and we recommend to the company that they shall not allow the tender to precede the engine."

Accident on an Incline.—On Tuesday as a train of stoue coal from the Mynydd Mawr Authracite Colliery was being conveyed from the incline which leads up to the mountain to Llanelly, the rails and wheels being alike wet, the breaks lost their power, and the wagons went off at a frightful rapidity. The conductors did not see the danger which threatened them; but, feeling a sudden jerk in the train, looked round, and, lo! the mangled bodies of three cattle stretched across the rails were presented to their view—one killed without evincing a struggle, the other two so far injured as to make it advisable to destroy them. The wagons eontinued still on the rails, and went on their wayward course for Llanelly New Dock, which they possibly would have reached but for a timely obstruction at Parkyrhyn-bridge, which at once stopped their progress and saved the lives of the conductors from further danger.—*Carmarthen Journal.*

FOREIGN RAILWAYS.

Receipts on the Belgian Railways.—The following is a statement of the number of passengers, luggage, and merchandise conveyed on the railroads from the 1st to the 30th of April last. In that period there were 187,554 passengers, that is—by diligences, 14,378; chars-à-bancs, 57,512; wagons of the first class, 65,886; of the second class, 49,748, and 30 soldiers. The number of packages of luggage amounted to 485,750; merchandise by diligences, first division, 16,694; seeond division, 1,023,190 kilogrammes; heavy goods, 10,144,372 kilogrammes. 142 carriages, 62 horses, 423 cows and oxen, 146 sheep, &c. The total amouut of receipts has beeu from 461,029 frs., divided as follows:—Passengers, 316,519; in diligences, 60,632; chars-à-bancs, 123,726; first class wagons, 84,726; second class, 47,313; soldiers, 64; luggage, 11,835; merchandise, 132,680.

Surveys for the railroad from Naples to Manfredonia are about to commence with the greatest expedition. This railroad is intended to effect tho junction of the Mediterranean and the Adriatic. It will hranch off at Nocera, on the line of the railway from Naples to Nocera and Castellamare. The expenses are estinated at sixty millions of francs. Tho King of Naples has also commanded surveys to be made for a railroad from Naples to Caserte, with a branch to Capua.

Tho *Moniteur Belge* says:—" Germany is rapidly treading in our footsteps, in tho formation of railroads, and has already by this means united many of her great towns. But the whole of central Germany, and particularly the wealthy land of Saxony, is still separated from the sea and Belgium by a considerable space between Frankfort and Leipsie. This vacuum, however, has by order of the Duke of Saxe-Coburg, been surveyed throughout its whole extent by his chief engineer, M. De Ridder, who has earefully examined several lines. A railroad from Frankfort to Leipsic would completo the junction by this mode of conveyance between Berlin, Dresden, Brussels, and the Belgian ports. On this great eommercial road would abut an important branch connecting Bavaria and the duchies of Coburg and Meiningen, on one side with the North Sea, by Cassel and Bremen, and, on the other, with Pas de Callas, hy the Rhine and the Belgian railroads. M. De Ridder has carried his survey as far as Nuremberg, aud finds no rising ground above 3½ feet in 100, nor any other difficulty. Should these projects be carried into execution, Brussels will be brought within thirty-six hours of Leipsic and forty-four of Berlin."

Railways from Limbourg to Prussia.—The *Journal of Limbourg* has the following article:—" We learn that the preliminary operations for establishing a railway between this city and the Prussian frontiers, in connection with the railway from Aix-la-Chapelle to Cologne, with a side brauch to the coal mines of Kerkraede, are already completed. The committee of the railroad, whose object it is to connect the Zuid Willemsvaart with the Rhine, has examined the matter with all the eare that its importance deserves, and has prepared all the necessary plans and estimates to be submitted to his Majesty for his approbation on his arrival here. We also learn that the committee has lately had an interview with the eommitteo of the railroad from Aix-la-Chapelle to Cologne, and that the latter has declared itself ready to promote this undertaking, and likewise promised that the operations on the Prussian territory shall begin as soon as we have began ours.

RAILWAYS IN IRELAND.

In the House of Commons on Tuesday night, Lord Morpeth moved for leave to bring iu a bill for the makiug and maintaining of public railways in Ireland. He said ho wished, at this period of the session, to have the bill printed, for the sake of giving information to the public, and especially to the people of Ireland, on the subject. The agreement upon which the measure was founded had been entered into during the Easter recess. The general construction of railways in Ireland under the management and control of the Government, with the aid of the state and the full security for the repayment of the sums advanced, as proposed by the Government on a former occasion, he still considered to be the most desirable and expedient mode of establishing railroads in that country; but having reasou to believe that that proposition would not meet with the assent of the Legislature, he had declined to renew it. In this state of things a proposition was submitted to tho Government on the part of certain individuals of great character and station, both in a financial aud commercial respect, the heads of which were, that the Government should raise a capital of £1,300,000, to be applied, in the first instance, to the construction of a main liue, as projected by the commissioners, from Dublin to Limerick, crossing the whole breadth of the island, aud communicating from one sea to another; that the work should be executed by commissioners to be appointed by the Government (and, to obviate any jealousy that might arise to the selection of the Government, he would insert their names in the bill, namely, Sir J. Burgoyne, Mr. Griffith, the late commissioners, and Colonel Jones, the lato secretary to the railway commission); that the capital should be raised in debentures signed by two of the committee; that a board of control be constituted; that the debentures bear interest at 4 per cent. per anuum; that in case that should not be made good by the profits of the undertaking, tho deficiency to be charged upon the

counties benefited; but that in case of surplus profits, after the payment of all expenses, the holders of debentures to be entitled to a share in such profits in addition to the 4 per cent. interest; and that the commissioners named in the bill should have the sole direction of the works, and the entire management and arrangement of the line when formed. They would likewise be empowered to make other lines. The main feature of the proposal was the uniting the aid of private capital with the responsible control of public officers. His object was to afford a facility to the present Government, or any Government that might succeed it, to bring into final and practical operation a measure which, he believed, was really calculated to be of essential service to the people of Ireland.

The motion was seconded by Mr. Shaw, who expressed his gratification at finding one measure for Ireland, proposed by the Government, to which he could give his hearty support.

In answer to questions from Lord Stanley and Mr. Serjeant Jackson, Lord Morpeth stated that it was not intended to proceed upon the principles observed in all private railways, of making the assents or dissents essential to the success or defeat of the measure; but he intended that compensation should be granted to the landowners upon the precise principle adopted in the Shannon Navigation Bill, which had been found to work most satisfactorily.

With regard to the operation of the bill upon counties along the margin only of which the railroad might pass, Lord Morpeth said, that the counties would be assessed according to the benefit they respectively derived from the railroad, without reference so its course.

Leave was given to bring in the bill.

TO CORRESPONDENTS.

We cannot undertake to determine the comparative merits of the different brick-making machines respecting which DELTA *inquires. The* MARQUIS of TWEEDDALE's *is among the best. The previous use of an invention on the Continent will not invalidate a patent in England.*

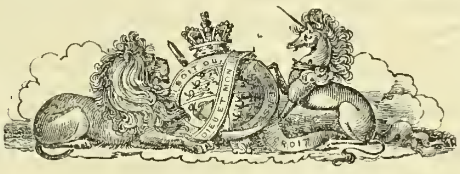
*To our correspondent at Sheffield, who inquires whether we do not sometimes omit specifications, we reply—"*NO*;" every specification enrolled is noticed in the* INVENTORS' ADVOCATE. VARICAS' *patent was not specified.*

MR. WILLIAMS's *publication on the combustion of coal, with other works received, will be noticed in our next.*

GRATUITOUS COPIES *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"THE INVENTORS' ADVOCATE" *is published every* SATURDAY MORNING, *at* 7 O'CLOCK; and is regularly issued in MONTHLY PARTS, of which 1 *to* 25 ARE NOW READY.

"THE INVENTORS' ADVOCATE" is also published in Volumes, containing the Nos. of every 6 months.



THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, JUNE 12, 1841.

One of the principal points on which the corn-law repealers and the supporters of the corn monopoly dwell, is the probable effect which the opening of the trade would have on the wages of labor, and the condition of the working classes. The anti-corn-law agitators rely mainly on the assumed cheapness of bread, consequent on the repeal of the existing restrictions, as the means of exciting the passions of the people, and of producing a general movement against the monopolists. The promise of cheap bread is so tempting a bait to hold out to a hungry populace, that it seems strange the excitement produced is not far greater. It indeed tells well for the judgment and intelligence of the great mass of the people, that they are not at once captivated and led away by the offer of cheap food. The subject has, however, been so often debated, and the arguments for and against free trade in corn have been so frequently stated, that we believe the people at length understand it is a subject attended with great difficulty, and that it is not merely a question between them and selfish monopolists.

The "cheap bread" part of the corn-law question is that whereon the free traders commit great inconsistencies, and contradict their own arguments, according as they wish at one time to gain over the working classes, or at another to conciliate the agriculturists. Whilst it is asserted, for instance, that the influx of foreign corn at a low fixed duty must lower the price, and give the workman a cheap loaf, it is stated, almost in the same breath, that the duty, the freight, and the shipping expenses, will in ordinary seasons counterbalance the advantages of the foreign grower, and that our farmers will have no real cause to dread the competition. Now it is self-evident that unless the effect of the reduction of duty be materially to lower the price of corn, bread cannot be much cheaper than it is under the existing monopoly; and if the price be materially lowered, the immediate effect must be prejudicial to the agriculturists. The repeal or the reduction of the duties on import cannot both keep up the price of corn and cheapen the price of bread. The attempt to reconcile the two propositions is absurd; it shows that the corn-law repealers feel the difficulty of a satisfactory adjustment of the question at the time they are most vehement and positive in asserting the unquestionable advantages of adopting their mode of settlement.

There can be no doubt that a plentiful supply of food is one of the greatest blessings a nation can enjoy; but it matters little to the working population how abundant the supply may be, if they have not the means of participating in the abundance. Nay, it adds to their distress to see that they are starving in the midst of plenty. To offer cheap bread is, therefore, a mere delusion, unless the means of purchasing it be assured.

It must be admitted that experience, so far as it goes, speaks strongly against the short-sighted theorists who imagine that cheap food must necessarily be a boon to the working population. In most countries where food is cheapest the laboring classes suffer the most deprivation, and are most destitute of the comforts and even of the necessaries of life. Wages will generally be regulated by the price of provisions, and where labor is abundant, employers will be able to procure it at a price little above the bare amount of subsistence. If, therefore, wages were reduced in proportion to the reduction in the price of food, whilst house rent, articles of clothing, and other necessaries remain the same, the condition of the laborer would be much worse than at present. His money would, indeed, go as far in the purchase of food, but as he would have a less amount to expend, he would be unable to purchase many little luxuries in which he now indulges, because they would be equally dear as before, whilst his weekly earnings would be diminished.

There is another consideration, also, which would affect the price of labor, were the land in this country to be thrown out of cultivation. The men now engaged in agricultural operations would be discharged, from want of employment, and would enter the labor market in competition with those by whom it is now overstocked. This increased competition would, of course, diminish wages to the minimum subsisting price; and the cheap loaf, which is now held up as an incite-

ment to agitation, would prove a sop thrown into the cup of Tantalus to add bitterness to his anguish.

We have previously expressed our anxiety that the question of the corn laws should be considered on its merits alone, apart from agitation, and distinct from party views. It is to expose the fallacy of the promises held out by the anti-corn-law agitators that we now endeavor to show the probable immediate consequences to the working classes of "cheap bread." So far as their interests are concerned, we believe that they would be as prejudicially affected by any sudden change as the agriculturists. The delusive boon of "cheap bread" would be to them a practical evil, unless it were gradually attained, so as to allow the absorption of the surplus labor in other channels, which the increased foreign trade, consequent on the trade in corn, would throw open.

The principal advantages to be anticipated, in the first place, from a fixed duty in lieu of the sliding scale, are, better regulated supplies of corn from abroad, increased steadiness of price, and the opening of regular markets for our manufactures in the corn-growing countries, where at present, owing to the uncertainty which attends our demands for their produce, English goods are but scantily introduced and little purchased. By gradually lowering the protecting duty on corn, as the agricultural and manufacturing interests adjusted themselves to the new state of affairs, the ruinous effects of a sudden alteration would be avoided, and the labor now employed in cultivating the land might be diverted without injury into other channels, even allowing that the same amount would not be profitably directed in agricultural occupations. It is not, indeed, improbable, that the effect of increased foreign competition in the supply of corn might have a similar effect to the introduction of the dreaded competition in various branches of our manufactures to which free trade principles have been extended. The result in the latter case has been, that our manufactures have improved in quality and diminished in price, so that they can now compete advantageously with the foreign goods. Our English farmers may, perhaps, under similar stimulus, employ their skill and capital with like effect to increase and improve the produce of the soil.

NEW INVENTIONS.

ELECTRO-MAGNETIC PRINTING MACHINE.

We have this week seen a very ingenious machine invented by Mr. Bain, in which electro-magnetic power is applied to printing; so that a person may be enabled to direct the typographical process at a distance of many miles from the place where it is actually performed. This seems at first view an impossibility, but a little explanation will show not only that the thing is possible, but the mode of doing it. The apparatus consists of two parts, one of which the operator directs, and the other, which may be called more particularly the printing machine, is to be placed at some distant station, say thirty miles off, or farther, according to the power of the galvanic battery and the thickness of the wires. On the portion of the apparatus that is directed by the operator, there is a dial, on which the letters of the alphabet, figures, and stops, are engraved, with a hand that moves round to point to them. The hand is moved by clock-work, to preserve uniformity of motion, which is essential to the correct working of the machine. On the face of the dial a circle is described, with the radius about half the length of the hand, into which circle there are inserted as many small pieces of ivory as there are letters and figures on the dial. The object of these pieces of ivory is to make and break the electric contact between the hand and the two wires of the battery, one of which is connected with the dial (which is insulated from the clock-work), and the other with the clock-work itself. Whenever the hand stops at the letter required, the connection is broken between the two wires of the galvanic battery, which extend from the dial-plate to the distant printing machine. The effect of thus making and breaking the electric current we will next describe. The printing machine has a small horizontal disc, moveable on an axis, with notches on its circumference, into which types of small size are fixed. The types consist of one complete alphabet, with figures and points corresponding to those marked on the dial-plate. By a peculiar and ingenious contrivance, to whatever letter the hand of the dial points, a corresponding type in the disc is, by the electro-magnetic attraction, brought opposite to a piece of paper fixed on a cylinder. The type, in turning round, rubs against a diminutive inking roller, and when it stands opposite the paper, the type, at the will of the distant operator, strikes against the cylinder, and the letter is printed on the paper. The latter effect is produced by means of a second powerful electro-magnet, actuated by the same battery with a separate connecting wire. When the electric current is completed, the electro-magnet draws the disc with the types to the cylinder, and when the distant operator breaks the connection, the disc is replaced in its former position by a spring. As the letter is withdrawn from the paper the cylinder turns slightly, so as to leave space for another letter to be printed, and thus the operation is repeated until the words and sentences required are printed. By means of a gradual vertical motion communicated to the cylinder, and also to the inking roller, they rise as they turn round, so that fresh inking and fresh paper surfaces are presented as they turn. The lines when printed, thus wind round the drum in the form of a screw. The object of this invention is, to afford a substitute for telegraphs. By thus printing the intelligence as it is communicated, there can be no uncertainty of its being received correctly, and the communications can be read as the cylinder turns round, or the paper may be taken off and transmitted, as impressed by the distant intelligencer.' It is calculated that by this means about twenty letters may be printed in a minute; the impression of each letter being made by the distant machine at the same moment that the operator touches the wires to complete the connection. There is another arrangement of the apparatus for producing the same effects with greater rapidity, but it is more complicated. In this arrangement the types are fixed at the ends of small levers. A small wheel is carried round with a projecting arm to come opposite the levers on which the types are fixed; and at whatever lever the arm stops that letter is printed immediately. This arrangement requires only the same number of connecting wires as the former, consequently, when the wires are once laid down either plan may be adopted. One advantage of this mode of communicating information over that of the common, or of the electrical telegraph, is, that the person receiving the information may have it direct without passing through a third party. For example, the printing machine, when properly adjusted, may be locked up, and the intelligence will be found printed there, should it be transmitted during absence.

LOCOMOTIVE EXCAVATOR.

The *Moniteur Industriel* gives an account of a trial of a locomotive machine for excavating, recently constructed at Rouen, which appears to be made on the same principle as the excavating machine contrived by Mr. A. S. Livingstone, a description of which was given in an early number of the *Inventors' Advocate.* This French machine is stated to be the invention of M. Gervais, of Caen. The trial of the apparatus was made in the presence of a committee of the Society of Emulation at Rouen, and of many of the distinguished residents of the town, and the result is said to have left no doubt of the possibility of making excavations by the power of steam. It is said to be particularly applicable in digging canals, and making the excavations for railways. The apparatus is placed on a large heavy kind of carriage, in the fore part of which there is a steam-engine of six-horse power, with oscillating cylinders and a tubular boiler, which works the machine, and also turns the two fore wheels very slowly, so that the whole is gradually moved forward as the work progresses; large pieces of wood being laid down to form temporary rails over which the machine is propelled. Towards the back of the machine there are two machines similar to dragging machines, which raise the earth that has been dug out, and deposit it in a horizontal endless chain of buckets, which carry the excavated earth beyond the limits of the trench, and there deposit it, forming an even and regular bank on each side. The excavating apparatus is placed about the middle of the carriage. It consists of four iron shafts parallel to each other and equi-distant, the whole four having their axes in the same plane, and forming an angle of fifty degrees to the horizon, the incline being towards the back of the machine. Each shaft has attached to it five double arms, equi-distant from the bottom to the top, and each arm is furnished with a spade-shaped tool. These shafts, therefore, present forty spades working at different heights, which dig a ditch nearly three metres in width and upwards of one metre in depth. Each of these excavating tools when in action strikes against the earth ten times in a minute. These revolving excavating shafts are put in motion by the steam-engine, and the action of the engine is so regulated that the whole machine progresses at the rate of about twelve metres an hour. The whole of the machinery, including the carriage, weighs about twenty-four thousand kilogrammes, or fifteen tons. When, owing to the nature of the soil or the presence of large stones, the action of the tools is resisted, the locomotion is stopped, and the whole apparatus is made to back, so as to enable men to remove the obstruction. The trenches dug by this machine are very exact, the sides are perpendicular and smooth, and the earth thrown out forms on each side a regular embankment. A machine of this kind was some time since shown by M. Gervais to the French Academy of Sciences, on which they reported very favorably, but it was not provided with the means of locomotion, nor was it on so large a scale as the machine at Rouen.

MANUFACTURE OF CARBOLEIN.

The manufacture of this new kind of fuel, invented by M. Weschinskoff, of St. Petersburgh, which we have before noticed, is thus described in the *Moniteur Industriel*:—"It is composed of coal, or of any other combustible, pounded as fine as possible, and mixed with a sufficient quantity of animal or vegetable oil. This mixture is subjected to a strong pressure, in order to produce pieces as hard and solid as stone. From an equal weight this carbolein yields five times more heat than common coal of the best quality. The flame which it produces is very bright, and burns for a long time. This property will render it extremely valuable in foundries, in the manufacture of arms and in glass-works, &c. In short, it will be useful for all purposes where it is important to obtain quickly a hot and continuous fire. It appears from the results of its use on the steam-ship *Sirius*, that the paddle-wheels which made twelve revolutions in a minute with the best coal, made nineteen in a minute when carbolein was used. This new combustible appears then to be very useful, and deserves that further experiments should be made in order to ascertain the accuracy of the results, which are stated to have been arrived at in the experiments already made."

SCIENTIFIC CORRESPONDENCE.

EXPANSIVE WORKING OF STEAM.

To the Editor of the "Inventors' Advocate."

SIR,—Your frank avowal following my letter in your last week's journal, does you honor, and I esteem you for it.

I must also beg to correct a slight error I discovered in that letter immediately upon reading it; for, "from each cubic feet there would be abstracted 19° of its latent heat," read 38° of its latent heat.

On the subject of working steam *expansively*, I have directed much attention and made many experiments, the results of which do not satisfactorily prove to me that it is economical for crank engines, and I cannot at present admit that the work done by the Cornish engines proves that their superiority arises from the adoption of that system; by referring to the *Civil Engineer and Architects' Journal*, for August, 1839, page 287, you will find a letter of mine, partly in reply to Mr. G. H. Palmer's and Mr. Wicksteed's papers, on the Duty of the Cornish Engines, published in the "Transactions" of the Institution of Civil Engineers; should you consider those views original, you may if you please, in reference to the present subject, insert them.

I am, Sir, your obedient servant,
Norwich, June 8, 1841. F. HAM.

[As we have not the number of the *Civil Engineer* referred to by us, we are unable to insert the letter. We shall be glad to be favored with Mr. Ham's opinions on the subject, and his reasons for concluding that the expansive working of steam is not economical.]

To the Editor of the "Inventors' Advocate."

SIR,—I shall feel particularly obliged if you will answer me the following queries at your earliest convenience. A. B. obtains a patent, but shortly afterwards gets into difficulties, and I advance him a sum of money on condition that he gives me as security, the *seal* of his patent; can he sell the patent right, or *invalidate* the patent, so long as I hold the seal? Should A. B. become insolvent, will the patent right be considered the property of his creditors generally; or shall I be able to put in my claim, and obtain the same without being the first creditor? I am, Sir, yours respectfully,

J. K. BANNISTER.

209, High-street, Wapping, June 8, 1841.

[The seal is considered only waste wax after it has passed the Great Seal office, therefore our correspondent's security is of no value whatever.]

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(Contributed expressly to the Inventors' Advocate.)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING JUNE 14, 1841.

Monday	Geographical Society	9 P.M.
Tuesday	Linnæan Society	8 P.M.
	Horticultural Society	3 P.M.
	Civil Engineers	8 P.M.
	Chemical Society	8 P.M.
Thursday	Royal Society	8½ P.M.
	Antiquaries Society	8 P.M.
Saturday	Asiatic Society	3 P.M.

ROYAL INSTITUTION.

June 4. Friday Evening Meeting.

Dr. L. H. Potts delivered a lecture "On the Food of Man, its Preparation and Preservation." After giving quotations from Plato, Buffon, Rousseau, and others, as introductory to the subject, the lecturer considered man as the only animal which cooks his food; as exemplified in the most uncivilised and uncultivated Hottentot, and the wildest savage, including even the New Zealander—all races of mankind eat their food in a cooked state. The subject of *taste* was considered especially in connection with the diversities of the sense as met with in the different races of men. Thus the Chinese are partial to food which is altogether obnoxious to the European, even though it be considered one of their greatest luxuries; the edible birds' nest was quoted as an example, specimens of which were upon the table, brought to this country by Mr. Cuming, who met with them in a cave some fourteen miles from the sea, in one of the Philippine Islands. Mr. Cuming is of opinion that these were formed from a fresh water plant, and not from sea-weed, which is the case with those most esteemed, and found in the crevices of rocks on the coast. Specimens were exhibited that sold for 35 dollars, others at the rate of four dollars per pound; they are partaken of by those only high in power, and are esteemed one of the greatest luxuries of the Chinese Court; they are stated to possess aphrodisiac properties; "and to say in China that a man eats birds' nests is equivalent to saying that he is a grandee or a person of some very great importance." The better kinds fetch between four and five guineas per pound.

Dr. Potts then proceeded to state that the following parts of animals are used as food in the countries where they abound:—The foot of the elephant, which is esteemed a great luxury when cooked; the paw of the bear, the tongue of the hippopotamus, the grubs of the palm tree, the mollusca, cuttle-fish; the raw entrails of fish, when allowed to become half putrid; the guana or lizard, four or more feet in length, formerly an inhabitant of the West Indies, but become very rare owing to its being sought after as food, although they abound in South America, and especially at Chili; in China rotten eggs are much used as food, &c. &c. The vegetable kingdom was also alluded to as affording an abundant supply of food to man.

The necessities of man either in a civilised or uncivilised state have called upon him to seek under many circumstances materials for sustenance, and among other substances which have been used as a substitute for the more expensive articles of food, the comminuted bark of the lime or linden tree has been made use of, and is reported to be of essential service in the manufacture of an article of diet; and men who have lived upon it from time to time have thrived and done well. Much has been said on this subject by a learned Professor of Tubingen, viz. on bread made from *Lignin*, which is by a long and tedious process partially converted into nutritious matter, in the proportion of three quarters of a pound of the bark comminuted mixed with a quarter of a pound of wheat and stirred up with milk. This mixture was partaken of by a family and a dog for some time; the dog from the beginning did not like it, while the others subsisted on it for a short period. The *Alburnum*, or false wood, owing to its being much softer than the *Duramen* or heart wood of trees, has been also used with good effect. The mountain or *Berg-meal* of Swedish Lapland, a mineral production, is likewise eaten to some extent; the composition of which Ehrenberg has shown to be almost exclusively that of the siliceous cases of animalcules.

Instances were recorded in which man had been known to be kept without food from 7 to 8 days; the same has also been noticed in animals. Dr. Potts briefly alluded to the process of digestion in man and animals, and explained the peculiarities of the digestive apparatus in the Ruminantia.

After some points connected with the nutrition of young animals, and the nourishment proper for their support, Dr. Potts made some remarks on culinary vessels and apparatus used in cooking from the earliest periods up to the present day. Many practical hints connected with the preparation of several articles ordinarily used as food were commented on at some length.

LINNÆAN SOCIETY.

June 1. Edward Foster, Esq., F.R.S., Treasurer, in the Chair.

The following papers were read —"Remarks on certain Plants of Brazil, with descriptions of some which appear to be new," by C. J. Fox Bunbury, Esq., F.L.S.—"Synopsis of the Coleopterous Family *Paussidæ*, with descriptions of a new genus and some new species," by J. O. Westwood, Esq., F.L.S. Mr. W. in this communication begged to remove the genus *Trichoideus* from this family, as inserted in his former monograph published in the 16th vol. Linn. Trans., as upon examination of its cibarian organs, he finds that it belongs to the family *Endomychideæ*. According to this author the genus *Trichoideus* now includes four, if not five species, viz. T. Cruciatus, *Dalm*—T. Dalmani, *Westw*—T. Desjardinsii, *Guer*—T. Americanus, *Bug*—and T. Hopeii? *Westw.* He then proceeded to describe the seven genera belonging to the family Paussidæ, two additional ones having been discovered since the publication of his former monograph. It was announced that the last meeting of this session would be held on Tuesday the 15th inst.

CHEMICAL SOCIETY OF LONDON.

June 1. Professor Graham, F.R.S., in the Chair.

The following are the titles of the papers which were read:—1. A letter from Colonel York, "On a Deposit of Arragonite in a Boiler."—2. Rühlman, "On hardening Chalk, or soft porous Limestones, by the Silicates of Potass or Soda."—3. Dr. Ure, "On Pyroxylic Spirit."—4. Marchand and Eidman, "On the Atomic Weight of Carbon."—And lastly, Hahm, "On Malic Acid and its Compounds."

BOTANICAL SOCIETY OF LONDON.

June 4. John Reynolds, Esq., Treasurer, in the Chair.

Dr. Killikelly, of Indiana, presented a specimen of *Tillandsia Usnoides*, obtained from the banks of the Mississippi. The following donations were announced:—A parcel of plants from Mr. J. M. Rich, the society's local secretary at Minorca, collected about Algiers. A few interesting plants from Sierra Leone, presented by Mr. A. Gerard. British plants from Rev. A. Rutherford.

A paper was then read by Dr. John Lhotsky, "On the Periodical Decortication of the genus Eucalyptus in Australia." One of the most curious phenomena which strikes the traveller in these regions is the appearance of the forest trees of the *Eucalyptus*—the bark of some of which is very brittle, falls off, and accumulates at the base of the trunk, or is scattered at some distance from it by falling off from the branches, contributing much to the barrenness and sterility of the soil, from the peculiarity of its fibrous structure producing but little *humus*. In some species the bark, instead of being of a brittle nature, consists

of long and flexuous fibres, and these trees present a very different appearance; the bark hangs down in strips, and when they have become loose, like the former, they fall to the ground. These strips are sometimes of various colors, giving to the trees in the forests of Australia an extraordinary and peculiar aspect; the color varying from white to deep red. The cause of a phenomena apparent in such a great number of species of a genus scattered most widely over the Australian continent is a matter of some importance connected with physical geography, and especially botany. Dr. Lhotsky considers that a clue towards an explanation may be arrived at, through the botanical axiom, that the concentric layers of the wood and bark are the reverse of each other, the former increasing externally, the latter internally. As exogenous plants (like the Eucalypti) increase by the annual addition of new matter on their outside, it is plausible to assert, that as the growth of the Eucalypti is almost in all species very rapid, the *alburnum* (white, or false wood) of these trees extends so rapidly, that the *liber* becomes first considerably distended, and being incapable of further distension, cracks, and finally separates from the trunk. The *liber* of most of these trees is brittle, and very spongy, although others are met with having a mere fibrous liber, and are termed by the colonists the stringy bark trees. Dr. L. considers it is also obvious, that in all trees where the *cambium* (proper juice) is copious, decortication will not take place, as it is capable of softening, and in this way render the liber more capable of distension. It is evident that the *Eucalypti*, with their scanty resinous sap, do not possess any quantity of cambium, which fact, in the opinion of the author, also promotes their decortication. As in the process of the decortication, the outermost part of the alburnum has to become the epidermis of the future bark, a series of changes takes place in this respect, and those parts of the trees of Eucalypti which appear as if they had been white-washed after decortication has taken place, are those where the alburnum has been changed into cortical epidermis. With the bark of these trees, either separated as above described by nature, or artificially removed by means of instruments made of serpentine or trap, the natives collect the sheets of bark on which they repose, and thus, in a measure, protect themselves from the humidity of the soil. From such sheets of bark they construct their rude canoes, which are, however, only adapted for navigation on lakes. They bind them together in a very imperfect manner, and fill up the crevices with soil and the melted gum of *Xantorrhus*.

The chairman then announced that the meetings of the society would be held on the first Friday in the month, from the present time until the commencement of the Winter session in November.

ROYAL SOCIETY.

At recent sittings of this society the following papers were read:—

"A Meteorological Journal for 1840, kept at Allenheads, Northumberland, with a few remarks on the Rain-gauge," by the Rev. W. Walton.—The author shows that if the mouth of a rain-gauge be placed in any plane which is not perfectly horizontal, the results will be liable to inaccuracy, whatever may be the direction in which the rain falls. He thinks that, on many occasions, the drops of rain diminish in their size during their descent on entering warmer regions of the atmosphere, so as finally to disappear.

"The Scholar's Lute among the Chinese," by G. T. Lay, Esq.—The Kin, which is the stringed instrument here described, was the one played upon by Confucius and the sages of antiquity, and is therefore held sacred by men of letters. It is made of the Woo-tung, or *Dryandria cordifolia*. It is convex above and plane below, and is wider at one end than at the other; it has two quadrangular apertures in the plane surface, which open into as many hollows within the body of the instrument; and it is furnished with seven silken strings of different diameters, which pass over the smaller end, and are distributed between two immoveable pegs below. A bridge within a short distance of the wider extremity gives these strings the necessary elevation and a passage to the under surface, where, by means of a row of pegs, they are tightened or relaxed at pleasure. The length of the sounding board is divided by thirteen studs of nacre, or mother-of-pearl, as a guide for the performer; and they are placed so that the length of each string is bisected, trisected, &c., that is, divided into aliquot parts as far as the eighth subdivision, with the omission of the seventh, the number of sections being represented by the arithmetical series

2, 3, 4, 5, 6, 0, 8.

Thus the intervals, or magnitudes of the different tones sounded by this instrument, do not accord with those produced on our violin, but agree more with the old Scotch music. The study of this instrument, and the art of playing upon it, are rendered extremely difficult by the complexity of the Chinese notation of written music, which leads to frequent omissions and blunders. Thus every air which a Chinese plays has cost him the labor of many months to learn; and so tiresome is this acquisition, that the author has heard some extemporize very prettily without being able to play a single air. Their performance, however, is very graceful; and though the melody be simple, every scope is given to variety by the mode of touching the strings. The author enters into an examination of the musical theory of the sounds produced by this instrument.

"Magnetic-term Observations taken on board H.M.S. *Erebus* and *Terror*, at Hobart Town, on the 29th and 30th August, and the 23d and 24th September, 1840, by and under the direction of Capt. J. C. Ross."

"Magnetic-term Observations made at the fixed Magnetic Observatory, Van Diemen's Land, on the 28th, 29th, and 30th August, and the 23d and 24th September, 1840, by Capt. J. C. Ross."

"Hourly Magnetic Observations for August and September, 1840, taken at the Ship's Magnetic Observatory, Van Diemen's Land, under the direction of Capt. J. C. Ross."

"Variation de la déclinaison, intensité horizontal et inclinaison magnétique, observés à Milan, pendant vingt-quatre heures de suite, le 24 et 25 Fevrier et Mars, 1841," par Signior Carlini.

"Remarks on the Birds of Kerguelen's Land," by R. M'Cormick, Esq., R.N., of H.M.S. *Erebus*.—The birds usually met with by the author in this island were petrels and penguins; and, besides these, he found two species of gull, a duck, a shag, a fern, a small albatros, and a species of Chionis; and also a remarkable nocturnal bird allied to the Procellaria. Brief notices are given of the forms and habits of these birds.

"Geological Remarks on Kerguelen's Land," by R. M'Cormick, Esq., R.N.—The northern extremity of the island is described as being entirely of volcanic origin. The trap rocks, of which the headlands are composed, form a succession of terraces nearly horizontal. Basalt is the prevailing rock: it assumes the prismatic form, and passes into greenstone, and the various modifications of amygdaloid and porphyry. The general direction of the mountain-ranges inclines to the south-west and north-east, and they vary in height from 500 to 2,500 feet. Many of the hills are intersected by trap-dykes, usually of basalt. Several conical hills, with crater-shaped summits, are found, evidently the remains of volcanic vents. Three or four very singular isolated hills, composed of an igneous slaty sandstone, occur in Cumberland Bay, presenting very smooth outlines, and consisting of piles of broken fragments, through which the mass protrudes, in places, in prismatic columns. Vast quantities of *débris* are accumulated at the base of the hills, in many places to the height of 200 or 300 feet or more, affording strong evidence of the rapid disintegration this land is undergoing, from the sudden atmospheric vicissitudes to which it is exposed. The whole island is deeply indented by bays and inlets, and its surface intersected by numerous small lakes and watercourses. These, becoming swollen by the heavy rains, which alternate with frost and snow, rush down the sides of the mountains and along the ravines in countless impetuous torrents, forming, in many places, beautiful foaming cascades, wearing away the rocks, and strewing the platforms and valleys below with vast fragments of rocks and slopes of rich alluvium, the result of their decomposition. The most remarkable geological feature in the island is the occurrence of fossil wood and coal, and, what is still more extraordinary, these are imbedded in the igneous rocks. The wood, which is for the most part highly silicified, is found enclosed in the basalt; whilst the coal crops out in ravines, in close contact with the over-lying porphyritic and amygdaloidal greenstone.

ZOOLOGICAL SOCIETY.

The ordinary meeting for scientific business was held on Wednesday evening, W. Yarrell, Esq., V.P., in the chair. A communication was read from Sir Robert Heron, Bart., M.P., on some experiments in breeding gold fish, being the result of observations in the author's menagerie. He found that about two in five specimens that were hatched were deficient in a dorsal fin, and that about two in a hundred had a triple-tail-fin. All the deformed progeny had been placed in a pond by themselves, but they did not produce any peculiar variety. A communication was read from Mr. Leonard, on some particular instances of intelligence in animals. The power of comparison in dogs was especially shown by many curious experiments exhibited to the meeting. Various articles, such as a pair of gloves, a roll of paper, a small box, &c., having been placed on the ground, another of the same kind being shown to two pointers, they selected the articles required. Their power in recognising numbers and colors was also exhibited in an interesting and curious manner.

ORIGINAL PORTRAIT OF SIR ISAAC NEWTON.

At a recent meeting of the Royal Society, a letter from Mr. Vignolles to the president was read, of which the following is a copy, accompanying an original portrait of Sir Isaac Newton, which he has presented to the society:—

"4, Trafalgar-square, London, March 25th, 1841.

"MY LORD,—I have the honor of transmitting to your Lordship, for presentation to the Royal Society, an original portrait of Sir Isaac Newton, by *Vanderbank*, a Dutch painter of some note in that age. This picture has now been many years in my possession, and the tenure by which I have kept it (as a collateral descendant of so illustrious a man) was too flattering not to have been a source of great personal gratification. But I consider such a portrait to belong of right to the scientific world in general, and more especially to that eminently distinguished society of which Newton was once the head, and which is now so ably presided over by your Lordship. I have, therefore, to request your Lordship will do me the honor to present this original portrait of Sir Isaac Newton to the Royal Society in my humble name. Accident having destroyed some of the papers of my family, I am unable of myself to trace the entire history of this portrait, but I believe more than one member of the Royal Society is competent to do so, and it is well known to collectors; and a small mezzotinto engraving of it was published about forty years ago. It was painted the year before Newton died, and came into the family of the celebrated Lord Stanhope, who left it by his will to my grandfather, the late Dr. Charles Hutton, a distinguished member of the Royal Society, expressly on the well-authenticated account of that eminent mathematician having been remotely descended from Sir Isaac Newton, in the following way, as I find on a family manuscript; viz., 'that the mother of the well-known James Hutton and the mother of Dr. Charles Hutton were sisters; and the grandmother

of James Hutton and the mother of Sir Isaac Newton were also sisters.' I have ever considered this very distant connection with so great a man should not be an inducement to lead me into any but casual mention of the circumstance, that I might avoid the imputation of a vain boast; nor would it have been brought forward now, except to explain the cause by which this portrait came into the possession of an individual who is happy in relinquishing it to grace the hall of meeting of the Royal Society.

"I have, &c., "CHARLES VIGNOLLES."

COPYRIGHT OF MUSIC.

The Lord Chief Baron of the Court of Exchequer gave judgment on Thursday in the copyright case of *Fra Diavolo*, which had been previously argued. His Lordship said the copyright in this opera had been assigned to Troupenas by the composer Auber for Great Britain and Ireland, after which Troupenas, for a sum of money which was acknowledged in a receipt, but no conveyance being executed, was said to have made over the right of Troupenas to Latour, and the latter also without any conveyance made over his right, such as it was, to Chappell; so that Chappell obtained no more than an equitable title to that which Troupenas originally purchased from the composer. Under this state of circumstances, the defendant, upon some contract with Chappell, became the purchaser of several copies at 35 per cent. below the trade price. After the death of Chappell, his widow obtained, on the 9th of June, 1836, a full legal assignment from all the parties who had before professed to deal with the right assigned by Auber to Troupenas. Then it is stated, that in the mean time, and before the widow obtained her legal assignment, the score of the opera had been imported from France, and parts of it sold by music-sellers in this country without any opposition on the part of Chappell, he being alive at the time of such publication here, and also, but previously stated in the answer, that some parts of the opera of *Fra Diavolo* were published without opposition by Chappell in a work called *The Harmonicon*. Thus the plaintiff's testator obtained no legal title whatever, an importation and publication takes place, and then, and not till then, a legal title is obtained in the year 1836. The question then is, will a Court of Equity lend its aid to support an equitable title, where there is a publication before the plaintiff has acquired a legal title? A great deal of argument has been used about the statute of Anne, and I think it clear that it was passed for the purpose of protecting native authors, and not for foreigners. Then the case of "Miller and Taylor" has been cited. I remember well the great notice that case attracted when I entered the profession. The judgment, though delivered by Mr. Justice Willes, is well known to have been the composition of Lord Mansfield himself. Mr. Justice Yates objected that an author had no common law right to his work after he had published, but that he had such right before. Lord Mansfield, and I think most truly, said that if an author had the right at all in his work, he had the same as well after as before the publication. Then in the case of "Lonsdale v. Beckett," in the House of Lords, the judges were divided, eight agreeing that an author had the common law right to his work—that is, an exclusive copyright therein; whilst three were of a contrary opinion, Lord Mansfield not giving any, though his opinion was well known to be with the other eight judges. Another question was, whether, as an author had such a right, he retained it after having published his work, and upon that point eight judges held he had, four being of a contrary opinion. This was the solemn decision upon the common law right. The statute had then limited the right to 14 years and no longer, and so put an end to the common law right, and conferred the limited right I have mentioned. Then it is made a question whether a foreigner, who by the laws of his own country has a copyright in his work, can make over that right to a subject of this country? I clearly think he may; but then the subject here can only have the right for the period given by the statute; the foreign author may communicate his copyright to an English subject for so long as the statute will allow him to hold it. I see, then, no difficulty in deciding this case. Mrs. Chappell acquired her right from a foreigner, and, considering the allegation of publication made in the answer, and the importation of the music in score, I think I am precluded from continuing this injunction. It is a question whether she acquired a legal title before any other party had published in this country, and that is a point for a court of law to decide. It may also be a question whether a party having a title to copyright, if the plaintiff has any title, which I do not say, and allows the work to be sold publicly, can afterwards acquire a title, and then prevent others from the privilege of publication. This is an important question, and cannot at all events be decided by this court. Mrs. Chappell can bring her action at law, if she thinks fit, to try her legal right, but this court will not interpose. This injunction must therefore be dissolved, and the defendant must keep an account of the sale of the music which the plaintiff contends has been pirated by him.

DEODANDS.

This humbug continues rampant enough, and also appeals against them, and for informalities too, endeavoring, like an Old Bailey counsel, to get out of a crime by a flaw in the indictment; with what credit we leave to those concerned. We have had a fine specimen of this lately on the Midland Counties, where they sought to set aside the two £300 deodands, in the cases of Taylor and Livesay. Let us see what the objections are; first it is pleaded that the inquest was held before the Derby borough coroner, whereas the county coroner was the right man, it is stated. What matters this, it was fairly done before an English jury. The next objection is, that the sentence of the jury was written as "positive nonsense, and many other words must be introduced to make it readable, or anything like common sense." We never yet saw a legal document which at all approached in its wording to common sense; but the fault usually is that words want leaving out, not putting in, the concoctors being paid so much per yard. Next we have the very silly argument that the jury valued the engine at £300, and then gave two deodands of £300, one for each man who was killed. If the jury were such geese as to value an engine at £300 which was more likely worth £1,300, that is no reason for any more people making fools of themselves by reversing the sentence. It is plain they valued the injury at £600; and we think the company had better have paid it rather than excite another discussion on the matter. When the law bills are paid, what will they be in pocket on the transaction, if they gain their cause; and if they lose it, how much more good money will be thrown after the bad? The whole question of deodands is so horribly absurd that we have hardly patience to write about it; why is not a proper fine inflicted, when the accident is occasioned by negligence or wilfulness, and given to the relations of the unfortunate sufferers? Yet here we have in this, a little enlightened age, a sum of money levied to go to the church, because when a man is killed in a hurry he is not shrived, and as the parson must have a pull at his pocket somehow, and has not got it before death, he picks the pocket afterwards of who he can get hold of, to pray the soul out of purgatory, and then the King or Lord of the Manor comes in, since latter years have discontinued the above absurdity, and they pocket the cash—yet we call England a nation of freemen.—*Railroad Monthly Journal for June.*

PATENT LAW CASES.

ALLEGED INFRINGEMENT.

In the House of Lords on Thursday, an appeal was heard, JAMES KAY *v.* JOHN MARSHALL and others, against two orders of the Master of the Rolls, made in a cause which the appellant had instituted in the Court of Chancery for an injunction and account on the alleged infringement of a patent. The bill alleged that the patent in question was for a new mode of spinning flax, the shortest fibres of which were, it was said, made available by the plan of the appellant, through first undergoing a process of maceration. The respondents were charged in the bill with having infringed the patent. The Master of the Rolls directed an issue, which, having been tried, and the jury having found special facts, which were indorsed on the postea, the cause was again heard before his lordship, when he directed a case for the opinions of the judges of the Court of Common Pleas on the validity of the patent, on the score of its being a new or useful invention. This was the first order appealed against. The judges having certified their opinions against the patent, the Master of the Rolls pronounced another order, dismissing the bill with costs. This was the second order appealed against, the appellant contending that, in substance, the finding of the jury had been decisive in his favor, and that the Master of the Rolls ought to have acted on that finding.

Sir W. Follett and Mr. Kindersley appeared for the appellant, and the arguments having been part heard, the further consideration of the case was postponed.

SCOTCH BANKING SYSTEM.

The deputation of Scotch bankers who were lately in London have published a report of their proceedings. From this report we learn that—

"The deputation found that very dangerous and erroneous opinions as to the nature and practice of banking in Scotland prevailed in the metropolis, which they are anxious to believe arise from ignorance of the working of the system, rather than from prejudice or hostility. The paper currency of Scotland is stigmatised as being irregular in its action and redundant in its quantity, but the published returns prove that it is regular, invariable, and limited to the daily wants of the community. It is also charged with pressing upon the circulation of London, though it is unquestionable that it cannot reach London or travel out of Scotland, being payable only in the latter country. The ordinary demands of the Scottish banks upon their supplies in London are excepted to as acting unfavorably on the foreign exchanges, when it is quite clear that these demands are the natural calls which every bank makes on its own stores of capital kept in London for the express purpose of being ready for contingent demands, and which would be so kept even were the currency purely metallic. It is also equally clear that in times of pressure there is a tendency of capital to flow from Scotland to London, rather than the reverse, such capital being attracted by the higher rate of interest which in such times invariably prevails in the London market.

"The establishment of one bank of issue, to supply currency for the United Kingdom, is at present a favorite project. This is the grand remedy for the imaginary evils alleged to be attendant on the Scottish system of banking, a remedy which would sweep away the whole present paper currency of Scotland, and entail upon that country an expenditure of about six or seven millions in purchasing an adequate supply of currency from this single bank, which would to that extent cripple the means of the Scottish banks in giving that expansion to the industry of the country which experience has proved to be of such vital importance to its prosperity. Knowing the existence of such opinions, the deputation, and more especially the two gentlemen who were to be examined, resolved that in giving their evidence the great object was to combat and refute errors and fallacies of a nature so dangerous." The report concludes with a recommendation to the bankers of Scotland to keep up the connection they have at this time formed for their mutual interest and protection in future.

SCIENTIFIC MEMORANDA AND NOTES ON ART.

Lilliputian Steam-engine.—In the window of a watchmaker opposite the Eastern Institution, Commercial-road-east, is exhibited a miniature working model of a steam-engine. This unique piece of mechanism is the production of a young man totally unacquainted with the improved principles of steam power. The engine, however, has been admired by some of the best working engineers of the day, and weighs something less than half an ounce. The engine-boiler, and appurtenances weigh together an ounce and a quarter. The boiler is heated, and the steam generated from water by means of a spirit lamp; the engine will work with a single charge of water for nearly half an hour, with a velocity equal to 500 revolutions in a minute. The whole machine may be deposited in a good sized pillbox.

Powers of Steam.—A steam coach running at a moderate rate, which is about 21 miles per hour, would run over a distance of 500 miles per day of 24 hours, and at that speed would reach British India from London in about 8½ days —or Pekin in China in 11 days—or from Gibraltar to the Cape of Good Hope in 10 days—or from Quebec to Cape Horn in 17 days—or once round the globe in 51 days—or 7 times round the globe in one year—or a distance equal from the earth to the moon in about 16 months, or from the earth to the sun in 500 years.—*Greenock Paper.*

Death of Sir David Wilkie.—The first of English painters died off Gibraltar on the 1st inst. Sir David Wilkie was on his return from Egypt, where he had passed some time in examining the venerable ruins of that ancient country. During his visit he had frequent interviews with Mehemet Ali, with whom he is said to have been a great favorite, and had taken one of the best likenesses of his Highness, with a view of having it engraved in England. The loss of Sir David Wilkie will be felt, not only in this country, but throughout Europe and America. His *Rent Day, Blindman's Buff, Penny Wedding, Chelsea Pensioners,* and many other now standard works of art, are as well known and as much admired in foreign countries as in his native land, and will render his name immortal. He came to London when he was about twenty years of age, and exhibited for the first time at the Royal Academy, in 1806. One great painting followed another in rapid succession, and in a few years he reached the height of his fame. Latterly his productions have been far inferior to those which brought him so justly into notice, as he attempted a different style of art and a more florid coloring after his visit to Spain. Sir David was fifty-six years of age at his death. He was the son of the Rev. Wilkie, minister of the parish of Oults, in Fifeshire, and was born in 1785. He was knighted in 1836, elected an Associate of the Royal Academy in 1810, and a Royal Academician in 1812. He was lately appointed principal painter in ordinary to her Majesty.

Pompeii.—A search among the ruins of Pompeii, which took place on the 27th ult., led to the discovery of a marble statue, a silver vase, and quantity of gold, silver, and bronze medals, in a good state of preservation.

VARIETIES.

Committee on Banks of Issue.—The first report of the select committee on banks of issue is now published. The committee report, that they are of opinion that it is expedient that an account should be published more frequently than is now required, showing with greater accuracy, and at shorter intervals, the average amount of promissory notes payable on demand which are in circulation in England and Wales, together with the average amount of bullion in the Bank of England; and that at the same time there should be published a similar account of the average amount of bank-notes in circulation in Scotland and Ireland, and that the witnesses examined unanimously concur in the opinion, that there would be no objection on the part of the various banks of issue to such a publication, &c. The committee add, that they have thought it advisable, without waiting till they have brought their proceedings to a close, to report their opinion on this point to the house, and to suggest the expediency of passing a bill without delay, amending and extending the provisions of the act 3 and 4 William IV., c. 83, for the purpose of obtaining the requisite returns from all banks of issue, and of providing for the publication of such an account. In accordance with the recommendation on the report, a bill was brought into the House of Commons on Monday, by Mr. Charles Wood, the Chancellor of the Exchequer, and Sir R. Peel, in which it is provided that after the 1st of July all corporations and copartnerships carrying on banking business under the provisions of the act passed in the 7th of George IV., and all other persons carrying on banking business in England and Wales, and issuing notes payable on demand, and all corporations and persons carrying on such business and issuing such notes in Scotland and Ireland, besides the Governor and Company of the Bank of Ireland, shall keep accounts of the amount of notes in circulation at the close of business in each week, and at the end of every month make up an average of the monthly circulation from such weekly account, and within seven days after the first of every month return the monthly account, verified on oath or affirmation, to the Stamp-office, under a penalty in case of default of £50. From the accounts thus rendered, and the accounts rendered by the Bank of England, an account is to be made up every month, and published in the *London Gazette,* of the aggregate amount of promissory notes payable on demand, distinguished into classes.

Transfers of English and Irish Stock.—An account has been published by order of the House of Commons of the stock transferred from England to Ireland and from Ireland to England from January, 1831, to May, 1841. The transfers from England to Ireland comprised £2,690,167 10s. 7d. 3 per cent. Consols; £176,923 8s. 2d. 3 per cents. Reduced; £1,187,334 7s. 5d. 3½ per cent. Annuities of 1818; £2,172,662 17s. 2d. 3½ per cents. Reduced; £2,805,616 5s. 1d. New 3½ per cents.; being a total of £9,032,704 8s. 5d. The Long Annuities transferred in the same period were in amount £534 19s. 11d. The transfers from Ireland to England comprised £1,890,797 16s. 1d. 3 per cent. Consols; £214,676 17s. 1d. 3 per cents. Reduced; £2,927,118 5s. 1d. 3½ per cents. Old Annuities; £413,891 6s. 0d. 3½ per cents. Reduced; £1,744,512 15s. 6d. New 3½ per cents.; £988 2s. New 5 percent. Annuities; being a total of £7,191,985 2s. 7d. The Long Annuities transferred were in amount £202 17s. 1d.

Foreign Wines, &c.—We extract the following particulars from a return just laid before the House of Commons.—"The total quantity of foreign wines imported during 1840 amounted to 9,311,247 gallons; the quantities exported amounted to 2,437,078 gallons; the quantities retained for home consumption, after deducting the amount exported subsequently to the payment of duty, were 6,553,922 gallons; the quantities remaining in warehouse under bond at the port of London, on the 5th of January, 1841, amounted to 6,920,398 gallons; and at the other ports of the United Kingdom to 4,470,069 gallons.

Irish Corn.—From a parliamentary return, it appears that the total quantity of various grain exported from Ireland in 1840 to Great Britain, the Isle of Man, Van Diemen's Land, the British North American Colonies, and the British West Indies, was as follows, viz.:—Wheat, 93,633 quarters; barley (including beer or bigg), 95,978 quarters; oats, 1,404,743 quarters; rye, 123 quarters; peas, 1,403 quarters; beans, 14,753 quarters; malt, 8,456 quarters; wheat meal and flour, 282,831 cwts.; oatmeal, 1,000,466 cwts.; and barley-meal, 78 cwt.

Attornies.—The number of applications to be admitted attornies at the Court of Queen's Bench appears to be on the increase every term. The number this term is no less than 169.

Post Office Money Orders.—New Regulations.—A new regulation has just been adopted at the Post Office, with reference to money orders, which will be the means of saving the public a great deal of unnecessary trouble and inconvenience. Formerly no one could receive the money but the person who was named to the Postmaster at the place where the order was obtained; but now, in all cases where personal attendance is inconvenient, if the party who presents the order can afford "full information as to the christian name, surname, address, and occupation of the person who originally obtained the order," the money will be immediately paid by the Postmaster to whom it is addressed; but not until these conditions are strictly complied with.

Copyright of Designs.—In the House of Commons on Tuesday it was agreed, on the motion of Mr. Mark Philips, that the clerk who attended the committee upon the copyright of designs in the last session of Parliament have leave to attend at the next summer assizes at Liverpool, and give evidence in an action now pending between William Ross and Edward Worthington, defendant, and to take with him and produce to the court and jury the minutes of evidence and all the proceedings and documents whatsoever had and taken under and pertaining to the said committee.

Neilson's Hot Blast Patent.—In the Court of Exchequer a rule was obtained at the commencement of this term to show cause why there should not be a new trial of the case for the infringement of Mr. Neilson's patent. The Court was occupied during the greater part of Wednesday in hearing the arguments of counsel in support of and against the rule. The arguments had not concluded at the rising of the Court, and no day was fixed for the further hearing.

Orthophonic Institution.—The subject of stammering and vocal defect having obtained considerable attention in consequence of the improvements recently introduced into the treatment of these affections, it has been determined, with the approval and co-operation of several eminent professional and scientific persons, to found in the metropolis an institution bearing the above name, under the superintendance of Mr. Yearsley and Dr. Tyler Smith, both of whom are known to have devoted much attention to the class of disorders in question. The object of the proposed institution will be, to afford, separately or conjointly, according to circumstances, medical, surgical, and educational treatment, in all imperfections of speech and maladies of the vocal organs.

Hand-loom Weavers at Glasgow.—Great distress prevails among these operatives at Glasgow from want of work. A deputation waited on the Lord Provost last week to state their case, when it was determined that temporary relief should be afforded to the most destitute until employment can be found for them.

British Museum.—The number of visitors to the British Museum on Whit-Monday was 9,031, being 3,177 less than on Whit-Monday last year. On Tuesday there were 1,986 visitors, and Wednesday, 2,636. The Museum is now open until 7 o'clock in the evening.

Zoological Gardens.—The young male giraffe was on Wednesday exhibited to the public, and was an object of considerable interest to the numerous visitors. It is in very fine health and well attended to by the dam, and, although but a fortnight old, stands seven feet high. The gardens have just received the valuable addition of a pair of fine leopards, presented by the Duke of Sutherland.

Ship Launches.—The dimensions of the *Trafalgar,* first-rate man of war, which is to be launched at Woolwich on the 21st inst., are stated to be—extreme length, 246 ft. 2 in.; keel for tonnage, 170 ft. 5 in.; extreme breadth 55 ft. 7½ in.; for tonnage, 54 ft, 9½ in.; moulded, 53 ft. 11½ in.; depth in hold, 33 ft. 2½ in.; height of counter, 26 ft. 10 in.; height of upper part of stern. 64 ft. 10 in.; burden, in tons, 2,172, 25-94 ft.; number of guns, of the largest calibres, 120. The Hindostan of 80 guns, is to be launched at Plymouth, on the 18th July.

Abscondment of a Railway Inspector.—Saturday afternoon information was received at the metropolitan police station-houses that between 11 and 12 that day, John Booth, an inspector of the London and Birmingham Railway police, had absconded from the terminus at Euston-square, stealing and carrying away with him a considerable sum of money, which he had been intrusted with to pay the men.

Effects of Railways on Turnpike Trusts.—The Commissioners of the metropolis roads have sent circulars to the parochial authorities in their district, informing them that owing to the great diminution of traffic on their roads caused by railways, they are obliged to retrench their expenditure. It is, therefore, their intention to discontinue lighting the roads, as the parties benefited are those living on the sides of the road rather than travellers.

Mutiny of a Fleet of Steamers.—On Sunday morning a novel mutiny took place on the river Thames, off Lambeth. When the time arrived for the iron steam-boats to get under weigh, the funnels were lowered, the colors struck, and the captains, crews, and engineers, all went on shore, leaving the vessels without a soul on board. The people who navigate the iron steam-vessels had been performing extra duty during the late fine weather without any increase of pay, and it was intimated to them that the additional passages would be continued during the summer months. The men asked for an increase of wages, which was refused them. In consequence of this refusal a meeting was held on Saturday night, and it was unanimously resolved to mutiny on the following morning and leave the steamers. When the fact became known to the directors they were in great consternation, and the mates were applied to, and requested to take charge of the steamers, but the mates said they were rowing in the same boat as the captains. Threats and entreaties were of no avail; all hands declined to navigate the vessels until their demands were complied with, and the directors at last were obliged to give way.

New Steamer at Brighton.—We learn from Brighton that a new steamer, built at North Shields for a company at Brighton, and fitted with Mr. Smith's patent screw propeller, on the plan of the Archimedes, arrived at the Chain Pier, on Tuesday morning, from the river Tyne, after the remarkably quick passage of 48½ hours. This vessel is intended to ply from Brighton to the adjacent ports, and to be occasionally used as a tug in towing vessels in and out of Shoreham Harbour. She is about 110 tons, with engines of 45-horse power.

Pacific Steam Navigation.—Accounts have been received from Valparaiso, dated the 13th of February last, which state that the company's agents at Talcahuano had procured a large supply of native coal, of excellent quality, and in great abundance, with which the steamer Peru had made a most prosperous voyage to Copiapo and back, netting between four and five thousand dollars from freight and passengers.

Steam Communication between Dresden and Prague.—The first steam-boat that ever made the passage between Dresden and Prague arrived from the latter city on the 30th ult. She is called the Bohemia, and was built expressly for that service, being flat-bottomed, having 121 feet in length, and 13 feet 6 inches in breadth. Her engine is of 40-horse power, and she is capable of carrying 40 passengers, and a considerable quantity of merchandise. When laden with a full freight she draws only 16½ inches of water, and makes the passage in about 16 hours. She is to travel to and from the two cities every three days.

Explosion of a Steam Boiler.—A dreadful explosion happened at Derwent Crook Colliery, Gateshead Fell, on Saturday afternoon last. It appears that about five o'clock the men employed at the works were in the engine-house, when they became suddenly apprised of the dangerous state of the boiler, and hastened out of the place. The knowledge, however, came too late. The boiler, which is said to have weighed four tons, was driven from its bottom, and carried by the force of the explosion over the engine-house. A large piece of the bottom plate fell on Mr. M. Almond, the engineer, with such force as to mangle the whole of one side of his body. He expired in great agony a very short time afterwards. All the other men (numbering eight or nine) were injured in one way or another—some by the steam, others by the falling stones and metal. One, named Young, breathed his last on Monday; and there is another so severely hurt that recovery is hardly looked for.—*Durham Advertiser.*

Accident in Blasting.—On Monday morning as the men on the London and Dover Railway were blasting a rock at Bletchingley, one of them named Lear applied the match to a train of gunpowder, but as it did not go off quickly enough he approached for the purpose of repeating the operation, when the gunpowder suddenly went off, and blew the man to a considerable distance, by which one of his thighs was broken, and the whole of his clothes having caught fire from the explosion, his face, stomach, and bowels were frightfully burned.

Discovery of Coal on the Coast of the Asturias.—Accounts from the Asturias state that M. Heredia, the proprietor of the rich lead mines of Adra, with the intention of introducing English coal into Spain, in an article published by him in the *Corresponsal* of the 10th of April, challenged the Asturias to supply him with 400,000 quintals, Spanish, of coal, for his manufactures. The challenge was accepted by the coal explorers, who have recently discovered at *Riva de Sella* beds of coal of a very superior quality. Riva de Sella would have greater advantage of situation for working the mine than Arnas, Santofirme, Terones, Sama, and Langres, on account of the facility of conveyance, and the quality of the coal is at least equal. It is also the best port of the Asturias. The ships being entirely sheltered, are not subject to the sudden squalls, from which they suffer so much in the port of Gigon.

The Weather.—The late change of weather, from the heat of summer to the cold of winter, has been experienced on the Continent as well as in England. In Paris the thermometer, which on Sunday was as high as 90 deg. of Fah., fell on Tuesday as low as 55 deg.

It is stated in a letter from Carlsruhe that on the night of the 23d ult., the small town of Parsberg was entirely burnt down; 224 houses were consumed.

Baron Heurteloup has arrived in this country, after a sojourn of several months at St. Petersburg, where he has been staying for the purpose of introducing his newly-invented musket into the Russian army.

Hammercloth of Coaches.—The hammer-cloth is an ornamental covering for a coach-box. The coachman formerly used to carry a hammer, pincers, a few nails, &c., in a leather pouch hanging to his box, and this cloth was devised for the hiding or concealing of them from public view.—*Globe.*

Salt-water Angling.—A Hampshire correspondent thus writes:—"So plentiful is almost every species of salt-water fish which is usually to be met with at this season of the year on our coasts, that in all the estuaries around Southampton the fishermen are making up for lost time. A person standing upon Limington-bridge, and using a single rod and line, has been seen to take as many fish in one tide as would prove sufficient to furnish the wants of half a dozen poor families. The varieties include mullet, base, whiting, coal, smolts, flounders, mackerel-guards, and eel. So great an abundance of the above welcome marine visitants has not been experienced in these waters for very many years.

Haymarket Theatre.—A new comedy was produced at this theatre on Thursday, entitled *Belford Castle.* The scene is laid in Scotland, and one of the principal objects of its production was to introduce Mr. Maywood, the celebrated representative of Scotch characters. The piece proved most successful. Mr. Maywood is the beau-ideal of a Scotchman; and his personation of the principal character is too national to be called acting.

ADVERTISEMENTS.

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T. DANKS and SON respectfully invite the Nobility, Gentry, and Public to inspect this NOVEL and ELEGANT CARPET, combining the beauty and effect of the best Brussels, at little more than half the expense.—98 and 99, Hatton-garden, Carpet, Bedding, and Floor-cloth Warehouse.

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TO BE DISPOSED OF an old established ENGINEERS, MILLWRIGHTS, and FOUNDERS' CONCERN, the present Proprietors retiring from the Manufacturing Branch, situated in London, arranged for a most extensive Business. The Premises will be let on Lease at a rental of £1,600 a year. The Machinery, Plant, and Tools are valued at about £14,000.—Applications, with real name, to be made to Messrs. Kerley and S. Ware, Solicitors, 5, Gray's-Inn Square.

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It was seen that, while enlightened principles and improved systems of business were being extended to almost every branch of commerce, the WINE and SPIRIT TRADE partook of little of these advantages—the consumers in many instances being supplied from small dealers, who frequently, from accidental or necessitous circumstances, were thrown into the wine trade without the slightest claim to a knowledge of its principles, possessing little or no capital, generally the most incompetent judges of the articles they professed to understand; and, from all these causes, perfectly unable to protect the interests and health of their customers. Thus a wide field was open for well-directed capital and exertion.

The Proprietors associated themselves with a gentleman educated from his youth upwards into a full knowledge and acquaintance with every department of their business, embarked a large capital, opened direct communications, and ultimately established intimate relations with the wine growers and shippers of all countries, thereby placing themselves in the most favorable position to take advantage of both the Home and Foreign Markets. They have always sold at a fixed and moderate profit, which, together with their unceasing desire to gratify both the tastes and wishes of their friends, has enabled them to succeed in raising their Establishment to its present eminence.

The Bonded as well as the Duty-paid Stock, embraces every variety of Wine, from the most economical up to the highest possible quality. Gentlemen who prefer it can make their selection of Pipes, Hogsheads, or Quarter Casks, in the Docks. In the Duty-paid Stock there are always from Forty to Fifty Pipes of Wine on Draught, of which any quantities may be had. The Bottled Stock contains from Five to Six Thousand Dozen of Port Wine, of the best Vintages, from two to ten years in bottle; the whole at the lowest prices consistent with the quality offered.

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The Proprietors, in returning their best thanks to the Public for the constantly-increasing encouragement their exertions have met with, beg to add, that their Business will continue, as it has continued since the 1st January, 1834, under the direction of Mr. Kislingbury, the Managing Partner; and their gratitude will stimulate them still further, if possible, to deserve its entire confidence.

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the pale, excellent Dinner Wine	30s
old superior, any color	36s to 42s
the extremely pale, dry, and high flavored	42s
very superior choice qualities	48s to 54s
the golden (Santa Maria de Xeres)	48s
Amontillade, very old	48s to 54s
very superior old East India	60s
MADEIRA direct	30s, 36s to 42s
West India	48s to 54s
East India, very old	60s
the Sercial, very old and scarce	84s
MASDEU from the wood	28s
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BUCELLAS	30s to 36s
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CALCAVELLA, the finest	38s
VIDONIA, London particular	28s
MARSALA, the best quality	24s
CAPE, good and superior	15s and 18s
PONTAC	18s and 21s

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—— best quality	12s
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ACTS OF PARLIAMENT.

PATTERNS,—

27 Geo. III., c. 38; 2 Victoria, c. 13; 2 Victoria, c. 17. (The last relates to patterns and *models.*)

PATENTS FOR INVENTIONS,—

2 and 3 Victoria, c. 67.

SCULPTURES,—

38 Geo. III., c. 71.

ENGRAVINGS,—

7 Geo. III., c., 38; 17 Geo. III., c. 57.

COPYRIGHT,—

8 Anne, c. 19: 12 Geo. II., (Booksellers' Act), c. 36 15 Geo. III. (Universities' Act), c. 53; 54 Geo. III. (General Copyright), c. 156.

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THE

INVENTORS' ADVOCATE,

AND JOURNAL OF INDUSTRY;

A WEEKLY BRITISH AND FOREIGN MISCELLANY OF

SCIENCE, INVENTIONS, MANUFACTURES, & ARTS.

No. 99.] SATURDAY, JUNE 19, 1841. [PRICE FIVEPENCE STAMPED. CIRCULATING FREE BY POST.

THE PREVENTION OF SMOKE DURING COMBUSTION.

The numerous methods that have been invented and patented for the consumption of smoke, show that it is a desideratum the perfect attainment of which is highly valued. In nearly all these contrivances, however, the inventors appear to have proceeded on erroneous principles, and without a proper consideration of the process of combustion, or of the effects which they ought to have endeavored to produce. The notion that is commonly entertained on the subject is, that smoke is a combustible *per se*, and that the only thing requisite to effect its perfect combustion is to subject it to the action of sufficient heat, by which it may be burned. It is on this view of the matter that the furnaces for "burning smoke" have been constructed. The smoke arising from the coals thrown on the grate is made to pass through fuel in a highly incandescent state, and by this operation it is supposed all the carbonaceous and gaseous products distilled from the fresh coal must be "necessarily" consumed, and a quantity of additional heat be thereby generated.

The ingenuity, labor, and expense bestowed on these fruitless efforts might have been spared, had the inventors made themselves acquainted with the nature of the products they undertook to consume, and with the conditions necessary to their combustion. They either overlooked, or were not acquainted with, the fact, that in order to produce combustion the combustible must be supplied with a proper quantity of oxygen gas, as well as heat; and that a volume of combustible gaseous products may pass through the hottest fire without being consumed, unless a supply of oxygen be furnished with which the rapid chemical union which produces the phenomenon of combustion may take place. So far from adding to the quantity of heat by this process of passing the smoke through hot coals, without a supply of air, an opposite effect is produced, for a quantity of heat is absorbed by the gaseous and carbonaceous products by expanding its volume, and also by converting the carbonic acid gas, which is the product of perfect combustion, into carbonic oxide, which is a combustible gas, and robs the coal of a quantity of carbon, which is carried off as an invisible gas. This, indeed, is the effect produced by the most successful of the "smoke burning" furnaces; the carbonic acid gas, resulting from the perfect union of carbon and oxygen in the process of combustion, which is carried off with the smoke, is converted, by subsequently passing through the heated coals, into carbonic oxide, and passes off in an invisible form; and though unseen, it carries away a larger quantity of combustible matter, and diffuses a more noxious effluvium, than the densest smoke.

In a recent publication by Mr. C. W. Williams, of Liverpool, "On the Combustion of Coal, and the Prevention of Smoke, chemically and practically considered," the circumstances attending combustion are thoroughly examined; and he has been led by his philosophical and searching mode of viewing the subject, to some important practical results. After stating simply the well-understood facts relative to combustion, chemically considered, he shows in a clear and convincing manner the errors of all those contrivances for burning smoke, to which we have alluded. The object to be attained, is not to burn smoke, but to prevent its formation by complete combustion in the furnace. In his reasonings on the nature of combustion, he proceeds on the assumption of the good old-fashioned and most comprehensible theory of heat, that it is an all-pervading subtile fluid, which is given out by compression or condensation, and absorbed by expansion; and that combustion is produced by the sudden liberation of heat on the condensation of gases into a smaller volume by intense chemical action, when the necessary conditions for their union are fulfilled. Proceeding on this hypothesis, it is to be inferred that the most perfect combustion takes place when the results of combustion are the most condensed.

Mr. Williams proves most satisfactorily that one of the necessary conditions to perfect combustion is an intimate union between the combustible and the supporter of combustion; and that it is essential in the construction of furnaces, not only to make provision for the proper supply of air, but that it should be so supplied as to be mingled intimately with the combustibles, so that their ultimate atoms, between which the chemical combination takes place, should be in contact with each other. To supply the air in undivided volumes, according to the usual practice, has the effect of cooling the fire, without supplying the quantity of oxygen requisite for combustion.

Another important disadvantage attends the common method of supplying the furnace with air from the ash-pit alone. Before the air can reach the gaseous combustible product distilled from the coal, it becomes vitiated by being deprived of a large portion of its oxygen in passing through the burning coals. It is heated and expanded also, therefore when such air comes in contact with the carburetted hydrogen, it is incapable of supplying the requisite quantity of oxygen for complete combustion, even supposing it could be intimately mingled and brought into immediate contact with the ultimate atoms of the gas. The mere expansion of the air by heat is, in Mr. Williams's opinion, prejudicial to combustion, notwithstanding the opinion of many engineers to the contrary, because the quantity of oxygen contained in any given volume is necessarily diminished when expanded; the chemical action will therefore proceed less rapidly, and a larger volume of air will be required to supply the requisite weight of oxygen.

Proceeding upon these principles, which appear to be well founded, Mr. Williams has contrived a plan which promises to meet the difficulties of the case, and to answer the necessary conditions of supplying air to the furnace in the proper quantities, in the right places, and in the manner in which it is most available for perfect combustion. With this view he provides two separate supplies of cold air to the burning fuel—one for the consumption of the solid carbon, the other to supply the combustible gaseous products. In his furnace there are numbers of small apertures near the bridge, which communicate with an air-chamber detached from the ash-pit, by which means jets of fresh air are injected into the heated carburetted hydrogen immediately after it is distilled from the coal, and is intimately diffused through the whole gas. Perfect combustion of the products is thus produced, not by requiring a second fire, but by supplying the combustible with the essential requisite for its combustion, without which the greatest additional heat would be useless. By this mode of rendering available the gaseous products of combustion an important saving of fuel may be effected, and the smoke nuisance prevented. The principle is admirable from its simplicity, and being based on sound philosophical views of the nature of combustion, it presents almost a certainty of successful application.

We shall take another opportunity of comment-

ing on Mr. Williams's views relative to the combustion of solid carbon; the present notice having reference only to the combustion of the volatile products from the distillation of coal.

ON THE GIVING WAY OF EMBANKMENTS.

The following remarks on the giving way of embankments, by M. Colin, principal engineer of the bridges and embankments of one of the largest canals in France, are the results of many years practical acquaintance with the subject.

The first appearance presented by a slope that has given way is that of an alteration more or less complete of its primitive form, whether natural or artificial. On examining the facts which strike the eye of the observer it must be at once admitted that the cause of the fall of a mass of moving earth must have operated either at a certain depth, or near the surface of the slope; therefore it is requisite, in all cases, to distinguish the superficial slips of earth from those that have a deeper origin.

When a mass of homogeneous earth is composed of argillaceous matter, which is liable to give way, the strata may be more or less inclined to the horizon. When the slip occurs on a pre-existing surface, the following considerations will not be applicable; the slips of this kind are very rare, and are only accidental occurrences, which we should be careful not to confound with the general facts examined by M. Colin.

The mass of fallen earth, whether natural or artificial, could not have been in a state of equilibrium in relation to the cohesion of its particles, which on the one hand tended to hold it together—and to gravity, which, on the other hand, tends to destroy the cohesive attraction. When this equilibrium is destroyed it must happen that the slope, or a part of it, will experience a spontaneous fall.

When by the action of the fall the moving mass is detached at such a depth that it preserves its central cohesion notwithstanding the fracture, which has destroyed the cohesion only on the surface of the slip, and notwithstanding that relative alteration in the angle of the strata which compose that mass,—in such case the cause of the slip must be pronounced to have proceeded from below, in contradistinction to that fall which occurs when the moving mass is detached nearer the surface, and when the cohesion of the mass is more or less destroyed by the action of external agents. It often happens, however, that both these kinds of slip occur at the same time.

This characteristic difference depends on the chemical nature of the soil, so that the same kind of slope may in one case experience a falling away from the surface alone, when in another case the cause of the slip may be more deeply seated.

There is another important difference between slips of earth proceeding from the surface and from below, which is, that the extent of the former is immediately known, while that of the latter may go on gradually increasing, according to the influence of rain, frost, and thaw. In every case, however, it is the action of gravity which causes the disturbance of the equilibrium; for the destruction of cohesion by the external agents is only an action eminently statical; the force of gravity alone causes the movement. It is therefore natural to infer, that as the principal cause of the destruction of the equilibrium is the same in all cases, the dynamical results must also be the same. Consequently the surfaces of slips, whether they proceed from below or from the superficies, ought, theoretically speaking, to be of the same kind, and to present, as regards their material points, a striking resemblance.

On examining with great care the general facts concerning these two kinds of spontaneous slips of earth, the angle of inclination of the falling earth, and that of the surface on which it falls, and comparing them with a great number of facts collected in various places, with different kinds of soil, and under different circumstances, by other engineers, as well as by M. Colin himself, he thinks he has established as a principle the following proposition :—

"When masses of earth nearly homogeneous, whether natural or artificial, are composed of such materials that the action of gravitation may, under the influence of certain physical circumstances, overcome the cohesion of their molecules, the results are spontaneous movements, which are called slips. These movements are independent of the height of the slopes on which they occur; they always present, nearly in the same degree, the character which appertains to them; lastly, and above all, the natural surface of separation, or the surface of the slip, has no pre-existence, and possesses a constant and regular form, which approaches more or less exactly, according to different circumstances, to a surface of a cycloidal shape, which brings the causes of its formation essentially within the domain of mechanical science."

MANUFACTURE OF IRON IN FRANCE.

The department of Haut Saone, which the number of its productions renders the most important of the French departments, and is also distinguished by the superior intelligence which characterises its undertakings, has during the last three years made great exertions for the improvement of the manufacture of iron. These exertions, as in former periods, have been manifested rather by the trial of new methods of manufacture than by the establishment of new manufactories. This direction of industry is easily explained in a country where the nature of the minerals, and the excellent quality of the products encourage the exclusive use of wood fuel in essential branches of manufacture. The object to be attained is evidently to derive the best possible advantage from a supply of a combustible limited by the present extent of forests, and the price of which is continually increasing. Only two manufactories, the forge of Romchamp and the blast furnace of Ancier, have been established since 1836, and are not mentioned in the general list of the foundries and forges of France, inserted in the statistical enumeration of manufactories by the administration of the same year.

The former of these, however, is not in work; the blast furnace of Ancier, which is supplied with charcoal, and a cold blast, is the only one in operation. The manufactory of Conflandey, which was out of work for many years, resumed its operations in 1837 with improvements, which will be presently mentioned. The changes which have occurred in the number and nature of the foundries and forges of Haut Saone are therefore of little importance in the total enumeration of these establishments.

When the results of the newly-tried experiments made during the last three years by the generality of the iron masters of Haut Saone, are attentively considered, it will be perceived that the various methods which in 1836 were but in an experimental state, are now regularly established, and may be called naturalised in many manufactories.

Thus the use of wood, either in a green state, or in different stages of torrefication, is now adopted in thirteen blast furnaces in the department for the fusion of the ore. It was at one time hoped, that wood in a green state might be substituted for charcoal; yet of all the furnaces where this method of fusion was tried, only one, that of Saint George's, has continued to employ green wood alone, without any mixture of charcoal. In the greater number of the other foundries, a mixture of two-thirds of green wood and one-third of charcoal has been employed on an average. This was the case in the manufactories of Breurey, Magny, Trécourt, Villexon, Estravaux, and Baigne, while at Loulans, Larrians, Fallon, and St. Loup, the quantity of wood has not exceeded from one-fourth to one-eighth that of the total quantity employed.

The results which have been obtained from the use of wood in a natural state, in these various proportions, have confirmed the experience of preceding years, and have proved that by the use of a large proportion of wood in blast furnaces, there would be an average saving of fuel of about 15 per cent.; but that the blast furnaces have a less regular draught than when charcoal alone is used. In some situations the saving arising from the use of wood in a natural state has likewise been balanced by a diminution in the daily production, and even in the proportionate quantity of metal yielded by the ore.

It must, however, be observed, that the process has been tried in blast furnaces constructed for the use of charcoal, and that, excepting some few advantageous alterations, the interior form of the furnaces does not appear to have undergone any change to adapt them to the different kind of fuel. It appears clear that the diminution in the yield of the ore and in the daily production ought to be attributed principally to a decrease of temperature which takes place, particularly in the upper part of the furnaces. There are, then, some future improvements to be hoped for, either by the more suitable construction of the apparatus, by the supply of a greater quantity of air, or by some other improvements tending to raise the temperature, and to render the descent of the charge more regular.

In this respect a trial has been made, which, apparently, ought to be advantageous, inasmuch as it in some measure obviates the want of cohesion and density that the charcoal which is made by the torrefication of the wood in blast furnaces possesses. At the foundry of La Romaine, wood in its natural state has been mixed with one-fifth part of its volume in coke, in such a manner as to compensate by the resistance of the latter combustible for the too great combustibility of charred wood. The disadvantage of this mixture is, that it injures the quality of the iron produced.

The necessity of preventing the cooling in blast furnaces, which is observed when they are supplied with wood alone, or by a mixture of wood and coke, has, since the origin of this process, given rise to the use of the hot blast.

Four other furnaces supplied only with charcoal, among which is that of Conflandey, which has recently commenced its operation, have also adopted the hot blast; this makes the total number of furnaces which have regularly adopted the hot air blast amount to seventeen. This new method of supplying air has only occasioned one alteration in the form of blast furnaces, and even this has not been general: the horizontal section of the furnace has been slightly increased as well as the diameter of the nozzle of the blast pipe.

The alterations made at the opening of the blast pipe, and an increase in the pressure of the air, cause the supply of air to the blast furnaces to be nearly equal to the weight of cold air which was formerly supplied; but it has not been possible to accomplish this without an increase in the moving power, or by a better construction of the blowing machines.

The attempts made to improve the refining of the iron have generally led to a more uniform application than those which have been mentioned for the fusion of the ore. Thus it was in Haut Saone, that the method was first introduced designated in the annual reports of the administration as the *methode comtoise modifiée*. This method, analogous to the process of refining by charcoal now adopted in Great Britain, consists in reserving the use of charcoal for the refining properly so called, which produces only bloom. These are again heated with coal in stoves of various forms, to be converted into iron of different kinds, according to the purposes for which it is required.

This method is already generally adopted in many forges where it is of importance, as in Haut Saone, to save the vegetable combustible without injuring the quality of the iron produced. It allows of those manufactories which are supplied with coal from a distance to be grouped together

near large streams of water in those places which are favorably situated for being supplied with this material, and where a great moving power can be rendered available; while those manufactories where iron is refined may continue in the situations where wood is plentiful and at a low price.

The substitution of green or dried wood for charcoal in the refining of iron has been a new means of saving wood fuel in many forges. The combination of each of these methods has usually produced a total saving of 41 per cent. on the wood previously used. When every deduction is made for the conveyance of coal, which is very expensive in this department, the average price of the manufacture of iron has, owing to the new processes of manufacture, experienced a reduction of 11 per cent.; the reduction is only 9 per cent. if torrefied wood is substituted for wood in its natural state.

In 1839 iron was always refined with dried wood without any mixture of charcoal, in the manufactories of Beaumotte, Bonnal, Viellersexel, Le Magny, and St. George's; in all these forges the hot blast has always been used when uncarbonised combustible has been employed. There has also been adopted in many forges a new and more expeditious method than the one generally used for preparing iron intended to be drawn into wire. Instead of being cut under the hammer, the wire, on coming from the refinery furnace, is placed immediately in the grooves of a roller, and are rolled into long prisms, which are afterwards annealed in a coal furnace, and being again submitted to the action of another grooved cylinder are converted into small round rods ready to be drawn into wire. In most forges the use of the shingling hammer has been retained in the first part of the operation; but in the second part of the operation the heating power of the gas issuing from the refining stoves has generally been turned to advantage.

The refinery furnaces in the manufactory of Maiziere were vaulted, and the hot blast introduced in 1839, and this double modification has produced a saving of 27 per cent. of the fuel employed; but it has been found that in order to preserve the good quality of the iron, it is desirable not to heat the air beyond 120° centigrade.

It appears that so far as experience goes in the forges of Haut Saone, the application of hot air in the refining process is only advantageous when there exists a certain relation between the temperature of the air, the nature of the fuel, and above all the quality of the metal. This temperature it appears should be between 80° and 120° centigrade in stoves where grey iron is refined; between 130° and 150° for red speckled iron; and between 160° and 180° for white iron. When the air is heated above these limits, the quality of the iron obtained is always deteriorated.

MANUFACTURE OF IRON FOR RAILWAYS.

A correspondent of the *Railway Magazine* directs the attention of the public, and of railway companies, to the fact, that an inferior quality of iron is frequently used in the manufacture of railway materials to the great danger of the passengers, and to the ultimate loss of the shareholders. We extract the greater portion of his observations on this important subject:—

"A considerable portion of this evil arises from the fact, that, with some very few exceptions, neither the directors, nor the engineers of railways, are pratically acquainted with the manufacture of iron, and are therefore not aware of the immense difference which exists in the quality. The price of railway axles (in their rough state) varies from £12 per ton to £25 per ton. The price of wrought iron wheels is just double the price of cast iron; in chairs the price varies as much as forty shillings per ton; and in rails there is a difference of from thirty to forty shillings per ton between different manufacturers; and this too in an article where from the enormous quantity used, the cost of production is calculated by the manufacturer with the greatest nicety. Now whence arises all this difference? Entirely in the quality of the articles themselves, and not in the amount of profit which different manufacturers consider themselves entitled to, nor in the difference in the expense of carriage from different parts of the country. For, by a strange anomaly, the cheapest, or rather the lowest priced, articles come from those quarters from whence the carriage is generally the most expensive.

"One great evil attendant on the employment of iron of inferior quality, arises from the circumstance, that iron exposed to great and sudden changes of temperature, and to a constant percussive action, is liable to a slow and gradual change, arising from a re-arrangement of the particles among each other. Although this may appear too theoretical for some, it is still capable of proof by direct experiments in particular and extreme cases. The two great distinguishing features of wrought iron are known by the names of "cold short iron," and "red short iron," the former being the toughest when hot, and the latter when cold. The cause of this great difference is still involved in mystery. It has been attributed to a minute quantity of arsenic in the former description of iron, which is not present in the latter. But this may well admit of considerable doubt, for by heatting red-short iron a few times, and suddenly quenching it with water, or by a longer continued process of heating without this sudden cooling process—as for instance in the case of wrought iron furnace bars—the most fibrous and toughest red short iron becomes converted into the most brittle cold short iron, the fibrous appearance being exchanged for that peculiar crystallised arrangement of the particles, which so distinctly marks the cold short quality. By what process this crystallisation takes place is wholly unknown; but many similar facts in natural philosophy would lead us to suppose, that the effects of sudden changes of temperature, under peculiar circumstances, merely cause the particles of matter to approach or recede from each other, to that particular distance which allows of a new arrangement of the atoms among each other. The instantaneous formation of ice, when water is cooled several degrees below the freezing point and a sudden vibration is communicated to it by a blow given to the vessel containing it, is a familiar instance of this kind of effect, arising from a new polar arrangement among the particles when, by change of temperature or some other cause, they are brought within a particular distance of each other. As regards this crystallisation of wrought iron, there are many facts which seem to lead to the conclusion, that iron continually exposed to minute vibrations, slowly changes to that state of crystallisation which can be more rapidly affected by the agency of high degrees of temperature: and if this be the case, we have in constant operation, in many instances, a process which is continually tending to weaken the cohesive strength of iron, and which will more readily take place in iron which partakes in any degree of the cold short character. This I think will scarcely be doubted, if we may at all draw any analogy with the process of the congelation of water already alluded to. When water has been cooled several degrees below the freezing point, a sudden blow given to the vessel will generally, but not always, cause its instant congelation. But if the smallest possible particle of ice be put into the water, the crystallisation of the whole mass will *always* be instantaneous. We may imagine, therefore, if any similarity exists between the two cases, that iron possessing *a tendency* to the cold short quality will, when subject to the constant state of vibration to which it is exposed on railways, more rapidly deteriorate than red short iron, and become more crystalline in its texture, and therefore possess less cohesive strength.

"But whatever may be the tendency to deterioration, there is far too little attention paid to procuring, in the first instance, iron which has been manufactured by processes likely to secure an approved quality. I need scarcely say, to those acquainted with the subject, that railway axles cannot be made of faggotted iron (which I consider indispensable for this purpose) for the low price at which they are charged by some manufacturers, and therefore inferior materials are always substituted. I shall, however, pass over this, and confine my remaining observations to the manufacture of railway bars and chairs.

"The iron masters have for many years been trying to avoid the process of refining the metal which is used for remanufacturing at the forge. As far as mechanical structure, and even chemical examination goes, the process of refining appears merely to reduce the better qualities of pig iron to the same state as the common "white iron" produced by the furnace. But experience proves that the one cannot be substituted for the other without a very great deterioration of quality in the manufactured bars. Many years of continued experiment have fully proved this, and it matters not, that no rational explanation can be given why the one will not answer the purpose of the other. All parties are agreed that "refining" is necessary to produce really good iron, and that no addition to the subsequent operation of "puddling" can compensate for neglecting it. But the saving of expense is considerable by this mode, and hence the Staffordshire iron masters are now very generally adopting the plan of omitting the refining process in the manufacture of rails, to enable them to compete with the Welsh manufacturers, who, it is supposed, can make iron cheaper than their English competitors. The processes which all pig iron ought to undergo, in order to convert it into bars, are, refining, puddling, shingling, rolling, piling, balling, and re-rolling. This makes common or No. 2 bars, which, when cut up and again heated, are rolled into rails. Now nothing *less* than this process ought ever to be employed for rails, and several manufacturers increase these processes in different ways, some by an additional hammering, and others by an additional heating and rolling, before rolling the iron into rails. But some also there are, who considerably *reduce* these processes, in the following manner:—They leave out *both* the refining and the shingling, substituting for the former a trifling addition to the time the metal remains in the puddling furnace, and for the latter, or shingling process, they give the blooms a "nobbling," as it is technically called, which puts the iron into a little better shape for the rolls, but adds nothing to its quality, as when the shingling hammer is used. Some manufacturers still further reduce these operations, by using a portion of No. 1 bars, which have only passed once through the rolls. Now the result of all this is that the finished rails, instead of being of a tough fibrous texture, are only one remove from cast iron in quality. The bars, if broken, will present a crystalline appearance; and in strength they bear no comparison to iron which has been properly manufactured. This I consider to be a most serious matter. Thousands, nay, tens of thousands of tons of rails have been made, and are now making in this way, and the directors and the engineers are alike ignorant both of the practice and of the very serious results to which it may lead.

"There are, however, other causes which deteriorate the quality of iron, not less than deficient processes of manufacture. The minerals of some districts are naturally so weak, that no art or care in the manufacture can render the iron made from them sufficiently strong for any description of railway work. I am unwilling to enter into particular descriptions, which might appear invidious, or which might seem the result of personal interest. Neither of these sentiments, however, influence me, as I have no interest whatever in the question, nor any motive beyond that of making known a matter of what I consider of great public importance.

"But if the question of the strength of the

minerals, from which the iron has been made, is a matter of importance in the case of rails, where, according to the general plan at present in use, the rails are made so exceeding strong, for the purpose of resisting deflection, that they may be considered comparatively free from the liability to actual fracture, it becomes of double importance in the case of railway chairs, which are constantly liable to fracture from the very nature of the materials of which they are made, as well as their form and the position they occupy. The very general introduction of the hot blast has tended much to deteriorate the strength of pig iron. I consider cold blast iron ought alone to be used in the manufacture of railway chairs; and not only so, but that the strongest descriptions only of cold blast pig iron, ought to be allowed to enter into their composition. Instead of this being generally the case, the greatest rubbish, provided only that it possesses the general characteristics of iron, is frequently used for this purpose. The very worst description of old iron, so bad as to be unfit for any other purpose, is purchased expressly for mixing with other iron to make railway chairs; and the only wonder is, not that such chairs should frequently break, but that they should ever stand the required strain. Others there are who mix the pig iron with the commonest description of hot blast iron; and others—and they too among the largest manufacturers—cast the chairs direct from the furnace, instead of making them from pig iron of the second fusion. Now, all these practices, while they tend to reduce the cost of the chairs, are, I contend, dangerous in the extreme; and no saving which can be effected by these means ought for a moment to be put in comparison of the danger which must result from the use of inferior iron either in the rails or chairs."

COLD-BLAST ANTHRACITE IRON.

As many parties interested in anthracite property have expressed a desire to be informed of the result of the experiment lately conducted by Mr. Player, at the Gwendraeth Iron Works, and which appears to have been attended with perfect success, we are happy in being enabled to present our readers with the following particulars, with which that gentleman has kindly favored us:—The cupola, five feet in diameter, was constructed on the plan of Mr. Player's patent, the minerals used being those procured from the estate—viz., clay iron ore, yielding about 30 to 35 per cent. of iron (the richer ores giving invariably the best quality of iron), and coal from several veins, each of which were tried in succession. The experiment was continued for eight weeks; the result of the first few weeks being much modified, by alterations in charges, fuel, &c., are not given, as the cupola could not be considered in a fair state of operation. The least quantity of anthracite consumed during one week was at the rate of 2 tons 18 cwt. per ton of iron, and it is to be remarked, that the best quality, the greatest quantity of iron was obtained during this week; but the average consumption during three weeks, when the cupola was working evenly and regularly, was 3 tons 2 cwt. 0 qrs. 13lbs. per ton of iron. The iron made during these three weeks was—9 tons 6 cwt., 10 tons 3 cwt., and 10 tons 2 cwt., respectively, the quality being No. 2, mottled, and white. The strength of the former was very great, as also that of the mottled; the third sort was proved by conversion into bar-iron, which was found to turn out very superior in quality, being extremely tough and malleable.—*Mining Journal.*

MR. WARNER'S DESTRUCTIVE PROJECTILE.

In the House of Commons on Wednesday, Mr. Wakley brought under notice the account, recently published in the *Times*, of the discovery of a projectile of extraordinary power, and which had been also described in a pamphlet by Mr. Walesby the barrister. Mr. WAKLEY alluded to the different notices which had appeared of the extraordinary effects of this invention, and observed that the House and the country were entitled to some information on a question of such vast magnitude, affecting the maritime power of the country, and important both as regarded the demands of humanity and considerations of public economy. If such a power as this was in existence there would be an end of war, for he believed very few persons would be found willing to expose themselves to such a force as was described in the account he had read. He wished therefore to be informed by Lord Ingestre, who had witnessed more than one experiment, whether the account were true, and entitled to belief.

Viscount INGESTRE said, that in his opinion the account of the experiment alluded to, was perfectly true. He very much regretted that this subject had been brought before the public by means either of a newspaper or a pamphlet, or by a conversation in that house; because he thought the immense power obtained by this invention ought to have been secured to the country in the most secret manner possible. He had been aware of this invention now for upwards of a year. His attention had been called to it by an indistinct paragraph which he saw by accident in a newspaper. It struck him that there was something behind more than met the eye, and he followed up the track. He could only state, that from that hour his conviction had become stronger every moment, that the possession of the invention was of the greatest possible moment to this country. He should hesitate in making this statement were it only his own opinion, but when the same opinion had been expressed to Her Majesty's Government by such distinguished officers as Sir Richard Keats and Sir Thomas Hardy, who unfortunately were now no more, he could not refrain from saying that this was a subject of the greatest possible importance to this country. There were other officers now living who had witnessed the experiment, and among them General Sir G. Murray, who had gone to see the experiment at his suggestion, and who was struck, as everybody must be, with the immense power which was contained in a small compass. That gallant officer had authorised him to say, that after communicating further with the inventor, he had had an interview with the First Lord of the Treasury, to state to him his opinion that Government ought to inquire into the matter. *The inventor of this new power had to his knowledge expended the whole of his fortune upon it, and* HAD BEEN FOR TEN YEARS ENDEAVORING TO PRESS ON THE GOVERNMENT THE NECESSITY OF TAKING UP THE SUBJECT. *He had been pressed in a way which he* (Lord Ingestre) *need not describe, but which was certainly most embarrassing, and he would say that the house and the country owed him the greatest possible gratitude for his patriotism in resisting the most tempting offers from foreign Governments, which would have at once relieved him from all his difficulties.* The gentleman of whom he spoke persisted nobly, determined to sacrifice his own pecuniary interests for the present, in order that the benefits of the invention might be secured to his own country. He (Viscount Ingestre) felt very strongly and deeply on this subject; he had taken it up in no light spirit; he had investigated it, and believed it to be of the most vital importance. Through his means the inventor had had communication, both personally and by letter, with the First Lord of the Treasury; he had not failed to urge on the noble lord the necessity of ascertaining whether the discovery were worth possessing or not. It could be easily ascertained, in a very short time, whether the invention were valuable or not; that was all he asked for; but he must say that it was cruel to the inventor and unjust to the country that the question should not long ago have been decided. He had given the noble lord at the head of the Treasury a warning that he might feel it his duty to bring the question before the house, and, had the session continued, he should probably have submitted a distinct motion with reference to it. Now that the matter had become public, he hoped no further time would be lost, but he must repeat his regret at this publicity having been given to it, as it would render negotiation more difficult with the inventor, and, in his opinion, the secret ought to have remained in the breast of the noble lord and of the inventor.

Sir F. BURDETT said that he had been a witness to the experiment, and, though no one could adequately judge of it who had not seen war, he would state that he could not conceive a sight more astonishing. The contrast between the small bulk and trivial appearance of the instrument, and the mighty effects produced, was most marvellous. The hon. baronet then went on to describe the explosion, which scattered the substance against which the projectile was directed into fragments, some of which were blown over a grove of high trees near the spot. He had himself raised up a fragment about half as large as the table. He hoped means would be taken to secure to the country a power of such magnitude, and which those who could estimate it said would produce infinitely greater effect than any invention of the kind yet heard of.

Mr. BROTHERTON said he was quite willing to give encouragement to all persons who invented engines for increasing the industry or augmenting the happiness of the people, but he must protest against any encouragement being held out to the invention of engines which he considered to be injurious to the peace and welfare of society. It might be said that the invention of these machines would put an end to war, but he doubted that. War was a remnant of barbarism, and ought to be discouraged by a civilised state in all possible ways.

The subject then dropped.

THE TIMBER DUTIES—THEIR EFFECT UPON THE LABOR OF THIS COUNTRY.

No country in the world affords a parallel to Great Britain in the skill of its artisans. As machinists and engineers they are unrivalled; and, if they excel in one department of mechanical construction more than in another, it is in ship building. This may, probably, in a great measure arise from the natural necessities of the country, from its insular position, and the consequent demand for that species of labor and skill which such a position requires. But independently of such a stimulus, ship-building, from the combination of great strength, manual dexterity, and mechanical intuition, which is necessary to perfection in the art (for it is an art), seems as it were chalked out by nature for English and Scotch operatives. *Cæteris paribus*—that is, put the Englishman or Scotchman on even terms with the Dane or Norwegian, and (to use, perhaps, a rather hyperbolical phrase) they would knock a ship's knees together before their rivals could saw them asunder. It is a trade requiring, as we have said, that combination of *head-work* and *handy-work* peculiar to the natives of this country; it is a species of labor, too, in which, as at once requiring strength and skill, they delight; and, if they possessed equal advantages with the artisans of other countries, they ought to be ship-builders for the whole world.

The question is why are they not so? The answer is—they want the prime requisite, the raw material. They have heads to think, hands to labor, tools to facilitate and shorten their labor—even machinery to relieve them of the mere drudgery of labor—but they want wood.

We need not go far to prove that we have not now the wood for ship-building at home. The timber duties have hardly left an old oak standing (except in ornamental grounds), and have not allowed a young one to grow to maturity. The temptation of a high price for an inferior article has reduced our woods to mere thickets, and, go into what part of the country we may, we will find even the hedgerows thinned of the ash and elm. Last year we travelled 150 miles in a direct line, and could only count thirteen oak trees by the road side! The truth is, that we cannot grow wood enough now for domestic purposes, and, therefore, the original motive for the timber duties—to encourage the growth of timber at home for ship-building purposes

—exists no longer. If we depended upon ourselves for the material, ship-building as a trade would be utterly extinguished amongst us. The monopoly has defeated—perhaps the proper word would be, has exhausted itself. Indeed, it has done more; Baltic timber is absolutely necessary, as all shipwrights know, to the construction of a ship which Lloyd's would class as A 1; and the English and Scotch growers cannot even sell the very little they have to sell, because they have hitherto been strong enough to exclude that portion of Baltic timber which is essential to the using up of their own commodity.

We regard ship-building as a *manufacture*—it is more strictly so than any other trade which passes by the name. Machinery is less engaged in it than in any other—the mind and hand of the laborer cannot be dispensed with in it, except in those preparatory alterations, which, if executed by hand, would require *great labor* and *little skill*. Is not *this* an advantage to the labor of the country? And one of our first ship-builders on the Clyde has estimated that the mere reduction of the duty on Honduras mahogany alone, which was proposed last session, would create a call for labor more than sufficient to compensate the country for any deficiency (of which there would be none) that could possibly arise in the demand for labor in the cotton manufacture. With such an opportunity to give employment to the labor of the country, is it not madness to exclude the material necessary to its employment? What would be thought of any man who should propose a prohibitory duty on raw cotton?—and yet it would be just as sensible as retaining the prohibitory duties on rough timber. Put the hypothetical question to the greatest stickler for monopoly—"what would be the effect of a prohibitory duty upon cotton?" He would answer, "to drive the cotton manufacture abroad." And it wants no hypothesis whatever to tell what has been and is the effect of the heavy differential duties on timber. It has driven ship-building abroad. "Seeing," says Mr. John Mitchell, in his evidence before the Import Duties Committee, "the difficulty of getting ships cheaply built in this country, I have thought proper to join several firms in Germany." The same candid testimony tells us, that if the protective duty on foreign timber was removed, instead of going to Germany for ship-builders, the Germans must come here for them. He has little doubt about "foreigners coming to this country to buy ships," if the material for ship-building could be got here at a moderate price. A still more remarkable instance of the effect of the timber duties on the labor of the country is that of the North American Shipping Company, the largest shipping company, we believe, in the world. Some years ago all their ships were built here; they had, and have now, a strong partiality to British-built ships, that is, ships of British work; but the timber duties have driven them to North America, where they get inferior workmanship for higher wages! Except casual repairs, they do not now employ a hand in England or Scotland. And, remark, it is all British capital which is thus driven away to employ foreign labor. The outcry against capitalists for avowing that their "capital owes no allegiance to the soil" is mere rant with the ignorant, and mere cant with those who know better. What man in his senses would be so patriotic as to give fifteen pounds a ton for a vessel in the Clyde, when he could purchase one equally good for ten pounds a ton at Dantzic? People will not sacrifice their property merely to humor or support bad legislation. And let it be observed, too, that in this case capital does not say to labor sternly, "You are too expensive, I must go where labor is chaper." No; capital merely says to labor, "I leave you with reluctance, because bad laws will not allow me to find the materials here for you to work upon."

We are no agitators in the vulgar sense of the term, but we should wish the working classes to understand this truth—that a demand for labor, though it may immediately only benefit a particular class, ultimately tends to the benefit of the whole mass of laborers; and nothing would tend more to relieve the pressure for manufacturing employment than such a demand for ship-building as would be created, and as the skill and industry of this country could supply, if the timber duties did not withhold from them the material, without which they must be idle and unemployed.—*Journal of Commerce.*

THE BANK OF ENGLAND AND THE CURRENCY.

(*From the Morning Chronicle.*)

To illustrate the truth of our doctrine that the country is not at present in a situation of sufficient financial strength to enable it to grapple with another drain of gold, similar to that which followed the bad harvest of 1838, we refer to the state of the currency and bullion in the Bank, in May, 1839, when the first operations were made by the Bank to stop the export of bullion, and at 25th of May, 1841, when the last *Gazette* averages were published:—

	May 28, 1839.	May 25, 1841.	Difference.
Notes in Circulation ..	18,214,000	16,615,000	1,599,000
Deposits	7,814,000	7,242,000	572,000
Total Liabilities	26,028,000	23,857,000	2,171,000
Securities ..	23,548,000	21,817,000	1,726,000
Bullion	5,119,000	4,921,000	198,000
Total Assets.	28,662,000	26,738,000	1,924,000

Now, taking the gross results of these comparisons:—

There is a decrease in the liabilities of..£2,171,000
But also a decrease in the assets of.... 1,924,000

Making the actual difference only .. £247,000

While the bullion has diminished £198,000, the circulation is less by £1,599,000; but the decrease in the securities exceeds the contraction in the circulation by £127,000. The Bank is, therefore, in no respect stronger than in May, 1839, for where there is a difference in her favor in some of the relative items, it is counteracted by others; and the decrease in the assets and securities shows that the institution has not the same resources at command to operate on the value of money, or to fight against an unfavorable state of the foreign exchanges. The rate of interest at both periods was the same; but in June, 1839, the rate was raised to 5½ per cent., and on the 1st of August of that year, to 6 per cent. From December, 1838, to May, 1839, the bullion had diminished from £9,362,000 to £5,119,000, a drain of £4,243,000; so that we find the Bank coffers do not contain much over half the amount that they held months after the deficiency of the crop of 1838 was known, and that the institution stands only in about the same ratio to real soundness as it did in May, 1839, when the alarming low state of its bullion compelled the directors to adopt extraordinary and stringent measures of safety.

The principal favorable point of difference we can discern at present is in the immediate absence of any drain of gold to pay for the people's food. But how long that may last is problematical. The exchanges, to be sure, have improved; but the change for the better cannot be attributed to anything like a really healthy or invigorated action in our export trade. Some improvement there may have been of late, but there are also £1,599,000 less of Bank notes now in circulation than in May, 1839, and we have reason to think that Exchange operations have been going on by means of bills drawn on the Continent against heavy shipments of silver.

REGISTRY OF DESIGNS.

The following is a List of the Designs Registered from the 12th of May to the 17th instant, under the Act of Parliament for granting Protection to Designs.

NO. OF DESIGN.	DATE OF DEPOSIT.	NAME OF PROPRIETOR.	SUBJECT OF DESIGN.	DURATION OF COPYRIGHT.
	1841			
696	12 May	H. J. and J. Dixon	Carpet	1 year.
697	17	Summerville Beckans	Pen	3 „
698	20	Edmund Heeley and Co.........	Filo	3 „
699	21	Thomas Freuch Berney	Gunstock.....................	3 „
700	24	Samuel Molyneux	Label	1 „
701	24	Wm. Wilkinson Nicholson	Bath	3 „
702	25	James Dobson and Sons	Carpet	1 „
703	25	Ditto	Carpet	1 „
704	27	John Gough and Sons	Carpet	1 „
705	31	Robert Rethie	Signal Lamp	3 „
706	31	Samuel Molyneux	Label	1 „
707 to 710	31	H. J. and J. Dixon	Carpet......................	1 „
711	31	G. and H. Talbot and Sons......	Carpet	1 „
712	31	Ditto	Carpet	1 „
713	2 June	William Elliott	Button.......................	3 „
714	7	Henry Woodward and Co.	Carpet	1 „
715	7	G. Barrett, and R. Armfield	Button.......................	3 „
716	9	John Baynes	Pen	3 „
717	10	Thomas Horne................	Cornice Pole	3 „
718	11	John Chatwin	Button	3 „
719	14	Capt. T. Warrington	Sword	3 „
720	15	Henry Davies	Governor....................	3 „
721	15	M'Michaels and Grierson	Carpet	1 „
722	15	Ditto	Carpet	1 „
723	16	Southwell's and Co.	Carpet	1 „
724	16	H. J. and J. Dixon	Carpet	1 „
725	17	Woodward, Gandle and Co.......	Carpet	1 „

INDUSTRIAL PROGRESS IN INDIA.

Some interesting particulars are given in the East India papers last received of communications read at a meeting of the Agricultural and Horticultural Society of Calcutta respecting the cultivation of flax there. According to M. Deneef, a Belgian farmer established there, the lands along the Ganges which are annually refreshed and reinvigorated by the inundations of that river, are eminently adapted for the cultivation of the plant, and he suggests various improvements in the mode of cultivation at the same time that he renders justice to the aptitude of the native Indians and the superiority of their methods in several respects over those pursued by the flax-growers of Belgium. He stated that be himself had despatched to London various qualities of flax and hemp of his own growing and dressing, in order to arrive at the market value of the articles. The growth of wool

was also progressing in India, and was zealously encouraged by the society. A communication was read from an old member of the society, now resident in Liverpool, to whom similar samples of wools were despatched as those which had earned the gold and silver medal premiums at Calcutta, in which he gives a flattering account of the opinion entertained of them, and the prices which they would fetch in the market. The report refers to plans for the improvement of sugar cultivation also, and the expediency of substituting the Otaheitan cane in cultivation, as greatly superior in productiveness to the indigenous kind in common culture. Industrial progress of every sort appears to be the order of the day in India. Amongst other enterprises may be enumerated the establishment and successful prosecution of breweries. The Agricultural Society had been taking measures for the encouragement of hop cultivation in India. In order to stimulate to the work, Mr. Bohle communicated a report of the success of his breweries at Meerut and Mussouree, the latter so far distant as the vicinity of the Himalayas. At Meerut, he observes, that he had for several years manufactured beer for the "men of the European regiments" posted there. Sometimes the consumption had been to the amount of 4,300 gallons per month: it was at the time of his writing about forty gallons a day. At Mussource he found a ready sale amongst the officers and families resident there. The brewers here, for India, some of whom have made splendid fortunes by their trade, may not particularly approve of these encroachments on what has been their exclusive domain till of late.

BRITISH PATENTS.

ENGLISH EXPIRED PATENTS.

JOHN WERE CLARKE, of Tiverton, for *an improved mode of attaching, fixing, or securing the dead eyes to the channels and sides of ships or vessels*, June 8.

JOSEPH CLISILD DANIELL, of Wiltshire, clothier, for *improvements in preparing wire cards, and dressing woollen and other cloths*, June 8.

CHARLES PHILLIPS, Capt., R.N., of Rochester, for *improvements in capstans*, June 8.

HUGH EVANS, Lieut., R.M., and W. R. H. KING, of London, tin-plate-worker, for *new table apparatus, to promote the ease, comfort, and economy of persons at sea, or on nautical excursions*, June 12.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 373.)

ALEXANDER HORATIO SIMPSON, of No. 6, New Palace-yard, Westminster, Middlesex, gent., for *an improved machine or apparatus for working pumps*, June 9.—This invention consists in a mode of working pumps by means of a pendulum or moveable weight, attached to a bar or rod suspended on an axis or wheel, on which it vibrates after the manner of a pendulum, the motion of which is communicated to the pump or pumps by suitable mechanism. The motion is obtained by placing the machine containing the pendulum on a body in motion, such as the deck of a ship, or by keeping the machine stationary and allowing the wind to cause the vibration of the pendulum; the stroke of the pumps in both cases being caused by the tendency which the pendulum has to preserve its perpendicular position. When the machine is stationary the top of the pendulum-rod is provided with vanes, on which the wind acts, and causes the pendulum to move in one direction; the return movement of the rod after each vibration is caused by the weight of the pendulum, the vanes being, by a peculiar arrangement, feathered, or brought with their edges to the wind, at the end of the vibration.

Claim.—The improved apparatus or machine, whereby the working of pumps is caused by the action of a pendulum, which preserves its perpendicular position when used as a ship-pump, while the vessel to which it is attached is in motion; and seeking to regain its perpendicular position when used on land, and acted upon by the wind, the body to which the pendulum is attached in either case being stationary.

THOMAS HARRIS, of Shiffnal, Salop, veterinary surgeon, for *an improved horse-shoe*, June 8.—This invention consists of a jointed horse-shoe made in five pieces, so arranged that expansion may be allowed in the heels without throwing all the motion to the toe as in the ordinary jointed shoes.

The pieces consist of a toe-piece, an off-side piece, a near side piece, and two conical rivets. The side pieces are jointed to the toe-piece at the quarters by the two rivets, by which means the necessary expansion is given to the heels without distressing the toe.

Claim.—The improved horse-shoe as described.

JOSEPH HALEY, of Manchester, engineer, for *an improved lifting jack for raising or removing heavy bodies, which is also applicable to the packing or compressing of goods or other substances*, June 8.—Claim first.—The general construction and arrangement of parts.

Claim second.—The forging and constructing the claw as a solid part of the main screw, and the guiding the same on the exterior surface of the jack, by which means the main screw is kept in an accurate perpendicular position when in action.

Claim third.—The placing of an internal screw-wheel inside of the stock, by means of which it is kept clean and protected from injury.

The stock or frame of the jack is formed of hard and well-seasoned wood, to which a facing of iron is screwed, the foot of the stock being covered and enclosed by a flanged sole plate, and the top by a turned iron cap. In a recess in front of the sole plate a steel plate bevelled to a sharp edge is inserted, by means of which the slipping of the jack is prevented when working on a hard surface in a leaning position. The handle of the jack is fastened to one end of a horizontal worm shaft, which takes into a worm or screw wheel, provided with an internal thread to fit the perpendicular lifting screw, which screw is either elevated or depressed, according to the direction of rotation given to the worm-wheel; the whole weight of the lift being borne by a strong wrought-iron plate placed underneath the wheel. An opening is made in the front of the stock, through which a strong claw forged to the lifting screw projects.

In using this jack the weight may either be supported on the point at the upper end of the lifting screw, or on the claw, in which latter case the screw is kept in a perpendicular position by means of shoulders or projections on the claw which press against the facing of the stock.

In lieu of the worm-shaft and worm-wheel, a bevel-pinion and bevel-wheel may be used.

ENTERED AT THE PETTY BAG OFFICE.

(*Continued from page* 374.)

WILLIAM PEIRCE, late of George-street, Adelphi, but now residing in Astley's-row, Islington, Middlesex, gent., for *improvements in the preparation of wool, both in the raw and manufactured state, by means of which the quality will be considerably improved*, June 9.—The object of this invention is to loosen and detach the resinous, glutinous, gummy, or other adhesive substances from the fibres of wool, and thereby render the fibres soft and pliant, and more susceptible of receiving coloring matters.

A mixture is made, in a suitable vessel, of eight gallons of water and one gallon of the strongest pyroligneous acid of commerce (any other acid in different proportions will answer as well), and into it as much wool is immersed as the mixture will cover. The wool is allowed to remain immersed for one, two, or three days, according to circumstances, stirring it occasionally, in order that every part of the mass of fibre may be thoroughly saturated. After the wool has been immersed the above-mentioned time, it is taken out of the mixture, and well washed, first in soft water, and then in the usual manner in soap and water, or other alkaline solution, after which it is pressed and dried, and may then be manufactured in the usual way.

Woollen cloth may be steeped in the above mixture previous to being dyed, but will require steeping a few hours longer than the wool in its raw state.

Claim.—The application of any acid, animal, vegetable, or mineral, for the purpose of loosening, extracting, or detaching the superfluous animal matter from wool, and thereby making it of a finer quality, and rendering it more suitable for receiving coloring matter in the dyeing process.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "INVENTORS' ADVOCATE" on the 21st of August.

William Edward Newton, of Chancery-lane, Middlesex, mechanical draftsman, due Aug. 15.

Theophilus Smith, of Attleborough, Norfolk, farmer, due Aug. 15.

James Whitelaw and George Whitelaw, of Glasgow, engineers, due Aug. 15.

Philip William Phillips, of Clarence-place, Bristol, gent., and William Bishop Peck, of Broad-street, Bristol, wine merchant, due Aug. 15.

James Ransome and Charles May, of Ipswich, machine-maker, due Aug. 15.

FOREIGN INTELLIGENCE.

FRANCE.

WINDOW TAX EXACTIONS.

The French ministers seem to be taking a lesson from our government, in the mode of imposing taxation. A new system has been adopted of levying taxes, which, as regards the window-tax, imitates the rigor and injustice of the English plan, which makes light the object of taxation, not according to its quantity, but the manner in which it is distributed. *La France* states that M. Humann, in his instructions to the supervisors of the window-tax, directs that "when one window is so placed as to give light to two rooms, that window be charged double." The *National* says, that in consequence of M. Humann's new system of collecting the taxes, several proprietors of houses had informed their tenants, that the surcharge laid upon them by the supervisors of taxes, would compel them to raise their rent.

The *Moniteur* publishes the report on the budget for 1842, laid before the Chamber of Peers on Friday last, which lays bare the present financial state and financial prospects of France. The report comes forth in a graver form and more serious tone than that made to the Chamber of Deputies on the same subject, and enters fully into the financial resources of the country, and shows, in a word, that "the contemplated loan" (of 450,000,000f. or £18,000,000 sterling) "would absorb the whole of the available capital of France," and that "to liquidate the remaining deficit, amounting to within a fraction of a similar sum (£18,000,000 sterling), would require the whole surplus of the sinking fund for six years to come." The report concludes by observing, that "this wholesale absorption of the entire floating capital of France at the present moment, and of its sinking fund for six years to come, and assuming that the revenue will in that interval undergo no diminution, leaves not one available shilling to meet exigencies," many of which were possible and are even suggested by the report, namely, "a commercial crisis, or the ne-

cessity for sundry expeditions to remote quarters of the world to support the honor and dignity of France."

The water continues to flow abundantly from the Artesian well at Grenelle, retaining its heat of thirty degrees of the centigrade scale, eighty-six of Fahrenheit, but still black and sandy. It has already rendered as much water as Paris consumes in twelve months.

The statue of Marshal Brune, executed by Lanno, the statuary, by order of the municipal council of Brives, in the Corrèze, in which town the Marshal was born in 1763, and where it is to be erected, was cast in bronze on Sunday morning week, at the foundry of Messrs. Soyez and Inge, in the Rue des Trois Bornes. The operation was performed in five minutes, with complete success, in presence of the committee, several friends of the Marshal, and a great number of artists.

A trial of the solidity of the new bridge at Saintes, the chief town of the Charente-Inferieure, was made in the morning of the 12th instant, but, unhappily, before half the load was placed upon it, the structure gave way, and fell, carrying six persons down with it. No one was killed, but M. Gon, the son of the contractor, received a wound on his head, from which he remained a long time senseless; when the account was sent off, hopes were entertained that his life would be saved.

M. Scribe, the celebrated French dramatic author, has, since 1812, written 315 pieces, which have produced him the sum of 2,400,000f. Each piece, in one or two acts, and in which he is often joined with one or two other authors, therefore averages 7,619f.

BELGIUM.

STEAM NAVIGATION ON THE MEUSE.

One of the new steam-boats intended for the Liegeian Company of Navigation, was last week launched in the Meuse. It was towed as far as the railway to Val-Benoit, in order to put in the boiler. Without the boiler, and with the engine alone, the draught of water of the boat was 21 centimetres; with the boiler it is 25 centimetres. The engine, which is a low-pressure one, and according to the Jackson plan, weighs only 2,400 kilogrammes. It was constructed in the manufactory of Messrs. Derosne, Cail, and Co., at Charenton, near Paris. Excepting in England and on the Loire, there are not yet any engines like it. The engines of the steam-boats which were in operation last year on the Meuse, were considerably heavier. The vessel which has just been launched is 3 metres and 50 centimetres in depth, and 36 metres and 50 centimetres long. Every thing on deck is nearly finished, and it will soon be able to commence working. Great progress is made in the construction of the second vessel, and it will be ready for service in a short time after the first. It is estimated that the draught of these boats, with their load of fuel, will not exceed 35 centimetres, while that of the former boats amounted to nearly 60 centimetres; we are, therefore, induced to hope that steam navigation, unless when the waters are excessively low, may henceforth be generally adopted on the Meuse.

A gasometer of sheet iron formed of 269 pieces, and of an immense capacity, arrived at Antwerp on the 5th inst., by the *Soho* steamer from England, intended for the gas works in that town.

A royal decree, published in the *Moniteur Belge*, of the 14th inst., authorises the establishment of a Society of Capitalists for the purpose of encouraging manufactures, and the conducting of useful enterprises. We shall, in a succeeding number of our journal, give some of the rules on which this useful institution is to be formed and managed.

A circular has been sent by the Governor of Hainault, to the different subordinate authorities in the province, informing them, by order of the Minister of the Interior, that the looms purchased in England at the cost of the Government, for the purpose of extending in Belgium a knowledge of the most recent improvements in weaving, have been submitted to the examination of the most skilful weavers in the country, the result of which is, that the introduction of the improved looms into Belgium would be the means of enabling them to manufacture fabrics which the present machines will not produce; and that the linen manufacturers would receive great benefit from the introduction of the improved looms. It is also recommended, that the looms at present in use should be adapted to the new improvements. The circular concludes thus:—"In communicating this information I must add, that the Government is endeavoring to find the means of extending throughout the country the knowledge and the use of the new machinery, as well as of the improved loom temple, so as to enable our weavers to derive advantage from these improvements."

An iron steam-boat is now constructing in the manufactory of M. Petry, an engineer, at Grevegnée-les-Liége. Persons experienced in the art of boat-building, who have had opportunities of seeing this fine vessel, consider that the country has not produced any equal to it. This steam-boat is to be employed in the navigation of the Meuse.—*Le Fanal.*

RAILWAY INTELLIGENCE,
DOMESTIC AND FOREIGN.

Report of the Select Committee on Railways.—The report of the select committee appointed to consider whether it was desirable for the public safety to vest a discretionary power of issuing regulations for the prevention of accidents upon railways in the Board of Trade, has just appeared. Sir F. Smith, the Inspector of Railways, thought such a discretionary power necessary for the safety of the public, for it is impossible, he says, to define the power which should be granted to the Board of Trade as to the course they should pursue for the prevention of accidents until it can be defined what are all the various causes having a tendency to endanger the safety of travellers by railway. On his recommendation, the discretionary power clause was introduced in the bill. However, in the evidence taken by the committee widely different opinions were expressed as to the expediency of vesting such a power in the Board of Trade. On the one hand it was stated by witnesses extensively connected with railways that they considered it very desirable that there should be some power to regulate a great number of things which could not be regulated in any other way, and to enforce a greater degree of uniformity of system than at present prevailed in matters essential for the public safety, and that they viewed the proposal without any apprehension of injury to their interests as railway proprietors. On the other hand, it had been strongly urged that the existence of such a power in a Government department would be injurious to the railway interests, and might tend to diminish rather than increase the safety of railway travelling by interfering with the responsibility of those intrusted with the management. It was further stated, that the existing power of supervision had hitherto worked well with cordial co-operation on either side, and this was likely to continue uninterrupted so long as it was exercised in the way of suggestion; but if an absolute power of enforcing regulations under pain of penalty were given, it might, although exercised with the greatest judgment and forbearance, have the effect of engendering on the part of railway companies feelings of jealousy and desire of concealment. Under these circumstances, the committee recommend that the Board of Trade should not at present have the discretionary power contemplated in the bill now before Parliament, and prefer that the supervision of that department should be exercised in the way of suggestion rather than positive regulation. At the same time they propose that minutes should be made of the various suggestions offered to railway companies, with a view to the suggestions themselves and the correspondence connected with them being forthcoming whenever called for by Parliament. The committee therefore suggest, that instead of the clause which provides this discretionary power, a clause should be substituted requiring railway companies to enter on the minutes of the proceedings of their boards of management, &c., all such suggestions as may be addressed to them by the railway department. With respect to any difficulties that might arise between managers of connecting railways in reference to their regulations and arrangements at the junctions, the committee think that in any disputed case it would be expedient to refer it to arbitration, and in the event of the disagreement of the arbitrators, that the railway department of the Committee of Privy Council, on application in writing by either party, should be authorised to appoint an umpire, whose decision should be final in such matters as may be submitted to him, and therefore recommend the adding of clauses to the bill to meet such objects.

London and Brighton Railway.—On Wednesday the first trip was made on the Brighton end of the line to Clayton tunnel, six miles from Brighton. A train of seven carriages, decorated with flags, conveyed about 170 persons up the line, for the purpose of witnessing the ceremony of keying the arch of the last length of the Patcham tunnel, which was performed by Mr. Statham, the resident engineer. In about a fortnight Clayton tunnel will be ready to admit the passage of trains, which will then be able to run within a distance of 10 miles from Brighton. Only about three miles of the road will then remain unfinished, and this portion of the line is in so forward a state, that its completion will take place in about six weeks. The line is to be opened from London to Hayward's-heath, a distance of 31 miles, on the 28th inst., and the opening of the entire road will not be delayed over the month of August. The company have entered into contracts with some of the Brighton coach proprietors for the conveyance of the passengers from Hayward's-heath to Brighton, on the partial opening of the road on the 28th inst.

Compensation for Injury by Accident on a Railway.—In the Secondaries Court on Tuesday, an action which was brought by Mr. Morse against the Eastern Counties Railway Company, to recover compensation for injuries which he received when a passenger on their railway, was decided in the Secondaries Court, the defendants having allowed judgment to go by default. Mr. Tomlinson, in opening the pleadings, said, the plaintiff, on the 19th of August, 1840, became a passenger and was conveyed on the Eastern Counties Railway from Brentwood to London, and he alleged that from want of care on the part of the persons who had charge of one of the company's carriages he received certain injuries which had caused him great bodily suffering, and put him to a large expense for medicines and the attendance of a surgeon, whereupon he laid his damages at £3,000. Mr. Thesiger, who appeared for the defendants, interfered, and a consultation took place between the Learned Counsel and the managing director of the railway company, which terminated in a verdict being entered for the plaintiff by consent—Damages £210.

Northern and Eastern Railway.—On Wednesday a special general meeting of the proprietors of this railway took place at the London Tavern, for the purpose of forfeiting certain shares, the calls of which were in arrear. The chair was taken by William Crawshay, Esq., who proposed a resolution for declaring forfeited seventy shares, the calls on which remained unpaid. The motion was carried

unanimously. The chairman said the shares all belonged to one proprietor. Several new by-laws were then passed unanimously. In answer to various proprietors, the chairman said the weekly average receipts from September to the present month were £455; during the time of the late floods they only received £112 weekly. Taking the average from last February it was £510 weekly. He expected they would shortly have £600 weekly. Out of this they would have to pay the Eastern Counties Company £200 per week, which would leave £400, and the average expenses in the latter would not exceed 50 per cent. weekly. In consequence of the reduction in the capital the shares had been reduced one-half, that was from £100 to £50. It was now £720,000, in 14,400 shares of £50 each. The line to Harlow was expected to be opened by the first week in August, when there would be ten coaches on the line. At present there are three coaches, but several left passengers at Broxbourne. A vote of thanks was then given to the chairman, and the meeting separated.

FOREIGN RAILWAYS.

Railroad from Paris to Corbeil.—In the month of May last there were conveyed on the railway from Paris to Corbeil, 94,579 passengers, 60 travelling carriages, and 67 horses; the receipts from this traffic amounted to 122,563 frs. The conveyance of merchandise, luggage, and parcels, amounted to 6,328 frs., making a total receipt of 128,891 frs.

The preparatory surveys for the construction of a railway from Maestricht to the frontiers of Prussia, in communication with the railroad from Aix-la-Chapelle to Cologne, and with a branch towards the coal mines of Kukrude, are just finished. The committee appointed to conduct these works, whose object is to connect by this railway the canal of Luidwillemsvaart with the Rhine, have conducted this business with the care and exactness that its importance requires, and have prepared the plans and estimates in order to present them to the King on his arrival at Limburgh. It is also stated, that this committee have recently had a conference with the committee of the railroad from Aix-la-Chapelle to Cologne, and that the latter have not only expressed their concurrence in the new undertaking, but their resolution to commence the works on the Prussian territory, as soon as the works on the other railway are put in operation.

LAW REPORTS.

ANOTHER RAILWAY INQUEST QUASHED.

In the Court of Queen's Bench, on Monday, the case of the Queen *v.* the Directors of the Midland Counties Railway Company, was brought to a close. In this case there had been an inquest held on the body of John Lindsay, who was killed by an accident which occurred on the railway in July last. The jury had found the death to have arisen from accident, and had imposed a deodand on the engines. The defendants applied for a *certiorari* to bring up the inquisition, in order to quash it. Several objections were made to the inquisition, on the ground of the insufficiency or doubtfulness of the allegations therein contained. The argument was confined to one point, namely, the construction of a sentence, in which it was said that it was doubtful whether the death was properly alleged, the pronoun and verb relating quite as much to the engine as to the person.

Mr. Macaulay was heard in support of the objections, and Mr. Waddington in support of the inquisition.

The Court thought the inquisition *doubtful in its language, and therefore quashed it.*

COMMON SENSE DEFEATED BY LAW.

Lord Denman gave judgment in the Court of Queen's Bench, on Monday, in the case of the Directors of the Manchester and Leeds Railway Company. It was an application for a *mandamus* to command the defendants to make a road the whole breadth of that which they had taken away. The road had been forty two feet wide, thirty-six feet for the carriage-way, and six feet for the footway. The Act under which the road was originally made did not require that the road should be so wide, but it had been so made, and had so continued till the defendants had appropriated it. The defendants had since made the road across where their railway travelled; but it was some feet narrower than the original road. Still the jury, upon the issue joined on the trial of the return to the *mandamus*, had found that the road been re-formed in a proper manner, and was more convenient than at its original width of forty-two feet. The prosecutors, however, insisted, that, as the Railway Act which gave the directors the power to cut the road required them to restore it as before, and made no allowance on the question of greater or less convenience, the old road ought to be restored to its original width, and a peremptory *mandamus* ought to go to compel its restoration to its former state. The Court was of opinion that the words of the act left no option, and therefore directed that the rule for a peremptory *mandamus* should be made absolute.

LITERARY NOTICES.

On the Subject Matter of Letters Patent for Inventions. By Thos. Webster, Esq. London: Crofts and Blenkarn.

This small publication forms a very proper adjunct to Mr. Webster's larger work on the "Law and Practice of Letters Patent." It is frequently a difficult question to determine whether an invention or a discovery, however useful or important, can be legally protected. It is with a view to show the bearings of the law on this point that Mr. Webster has published the present supplement, in which the different cases are classified, and their claims to protection are explained and illustrated by the citation of numerous cases, and by the opinions of different judges on the questions raised. To inventors and patentees, this small publication will prove of great value, as it shows them at once whether the nature of their inventions be such as to entitle them to such poor protection as the law affords, to the enjoyment of their rights. As an illustration of the uncertainty of the law, and of the perplexity to which it leads, notwithstanding the mass of verbiage by which it is attempted to be explained, and the reported cases which govern the decisions of judges, we make the following extract relative to the invalidation of a patent by previous publication.

"It has not yet been decided how far the publication of an invention, independent of any user, would vitiate a subsequent patent. A project or scheme may have been published as likely to succeed, but notwithstanding such publication may never have been tried; would this publication vitiate the patent of a person, who, without seeing this book, or receiving any suggestion, hits upon this same project, and finds it a useful invention, and introduces it into actual use and exercise? By the words of the statute, user by others at the time of the grant is the criterion of novelty, so that the words of the statute include all cases of re-invention. In the great fluctuations to which manufactures are subject, a process or mode of manufacturing once in constant use and exercise may be totally lost sight of; he who brings this again into use renders the same service to the manufactures of the country, as he who invents that which was never before known. The words of the statute also include those cases in which projects have been abandoned after many experiments, and an independent inventor or successful competitor availing himself of what has been before done perfects the project, and brings the invention into use.

"The letters patent contain a proviso for rendering the grant voidable, 'if the said invention is not a new invention as to the public use and exercise thereof,' without any reference to time, so that the proviso in the letters patent is more limited than the words of the statute.

"The very difficult and important question of novelty in connection with user, was presented in the following most luminous manner by Sir N. Tindal, C. J., in delivering the judgment of the Court of Common Pleas in a recent case: 'It will be for the jury to say whether the invention was or was not in public use and operation at the time the patent was granted. There are certain limits to this question. A man may make experiments in his own closet—if he never communicates these experiments to the world, and lays them by, and another person has made the same experiments, and being satisfied, takes a patent, it would be no answer to say that another person has made the same experiments; there may be several rivals starting at the same time: the first who comes and takes a patent, it not being generally known to the public, that man has a right to clothe himself with the authority of the patent, and enjoy the benefit of it. If the evidence, when properly considered, classes itself under the description of experiment only, that would be no answer. On the other hand, the use of an article might be so general as to be almost universal; then you can hardly suppose any body would take a patent. Between these two limits, most cases will range themselves, and it must be for the jury to say, whether the evidence convinces their understanding that the subject of the patent was in public use and operation at the time when the patent was granted.'

"This mode of viewing the question presents a practical test, which divests the question of much difficulty in the cases to which it can be applied.

"An invention practised in secret, is not such a user as will vitiate the patent of a subsequent and independent inventor; and there are many other cases of the same class—as where an invention has been long known and practised within the premises of the inventor by his own workmen and servants. Such knowledge and practice, so far as the public are concerned, are a perfect secret."

Practical Observations on the Causes and Treatment of Curvatures of the Spine. By Samuel Hare, Surgeon. London: Simpkin and Marshall.

Mr. Hare has in this work made known the results of many years' study and practice in the cure of spinal disease. The great increase of spinal distortion renders its consideration a subject of great importance, and a treatise which points out its causes and the mode of prevention, founded on practical examination, becomes a public benefit. Mr. Hare treats the subject scientifically. He considers the predisposing causes from infancy to maturity, and the modes by which the disease may be prevented and cured. Among the principal causes of spinal disease in females, the evil effects of tight lacing are particularly dwelt upon, and the necessity of freedom of action for all the muscles of the body is strongly enforced. Several cases are reported of cures effected by Mr. Hare, and engravings are given of casts taken of patients before and subsequent to his treatment, which exhibit most astonishing changes in conformation, the greatest conceivable distortion and deformity having been apparently completely remedied. The application of mechanical means Mr. Hare considers requires great caution; and he is of opinion that much injury is frequently done by the steel stays and "head swings," which are frequently used. The apparatus which he has employed with success is thus described:—

"It consists of an inclined plane, made of inch board, two feet in breadth, and about six and a half feet in length, furnished with feet, or made to rest securely on trussels; at the upper end are three pulleys inserted into a piece of oak, the latter being dove-tailed into the board; of these pulleys, the two outer are about four inches, the middle six inches in height from the board, the former ones being about eight or ten inches asunder. A similar piece of oak, having only two pulleys,

is attached to the lower end of the board; about one-third from the upper end of the plane, and six or eight inches from the sides, two openings are made, into which also pulleys may be introduced.

"The plane is made longer than an ordinary bedstead, that the weights may hang over at each end; it may then be placed upon it, with the upper end resting on the head-board, thus forming a very convenient inclination; or it may rest on trussels made for the purpose, in which case it can be readily removed from one room to another. A blanket or counterpane, four or six fold, is put on the plane, upon which the patient reclines. It is also furnished with a number of straps and weights for extension, and with compressers for pressure. A head-strap, made of soft leather, well stuffed with curled hair or cotton wool, and intended to pass under the chin and occiput, is fastened to a cord, which passes over the centre pulley, at the extremity of which a weight is suspended; shoulder straps, composed of the same materials, and secured in a similar manner, pass under the axillæ of each arm and over the outer pulleys, having weights also attached. Similar straps and weights are also applied round the ankles, and occasionally, in the male sex, above the pelvis; these are passed over the pulleys at the lower end of the plane; pulleys are also inserted in other parts of it for the purpose of passing other cords and weights, which may be considered necessary to be applied to any part of the body: shots in bags is the most convenient form of weight."

TO CORRESPONDENTS.

The diagrams of Mr. Rettie's *code of signals for steam vessels, and of the patent signal lamp have been received, but as he promised to favor us with his signals for railways next week, we propose to notice them all at the same time.*

Our facetious correspondent who sends "the last American," omitted to pay the postage. The alteration in the title of a patent "for certain improvements in carboys," to "improvements in carmen," may be classed under the common American heading of "Curious if True."

Gratuitous Copies *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"The Inventors' Advocate" *is published every* Saturday Morning, *at* 7 o'Clock; and is regularly issued in Monthly Parts, of which 1 *to* 25 are now Ready.

"The Inventors' Advocate" is also published in Volumes, containing the Nos. of every 6 months.

THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, JUNE 19, 1841.

The session of Parliament is about to be brought to a premature termination, without any thing having been done to advance and encourage the most important interests of the country. The few measures which have been brought forward calculated to promote manufacturing industry, and to stimulate literary, scientific, and artistical exertions, have been either suppressed, or are permitted to expire with the numerous other measures which are every night put off till another session. In the turmoil of conflicting party objects, and in the struggle for place and patronage, the consideration of the real business-interests of the country, unless they assume a shape that will serve as implements for party warfare, are sure to be the first thrown overboard.

It would be useless now to lament a state of things that is for the present irremediable, were it not in the hope that by frequently directing public attention to the utter neglect in Parliament of the improvement of our manufactures, a strong feeling might be excited, that would force on the consideration of the Government the necessity of adopting some measures for the encouragement of inventive genius.

A glaring instance of the neglect which inventors experience in this country, and of the difficulties against which they have to contend, was noticed in the House of Commons on Wednesday. The inventor of a projectile which promises to produce a complete revolution in the art of warfare, if not to put a stop to war altogether, after having succeeded in gaining the attention of the highest authorities in the kingdom, and after the most favorable reports had been made on trials of his invention, finds himself at last entirely neglected, and almost ruined; having spent a large fortune in perfecting his discovery. If such difficulties attend the course of an inventor, who has in the commencement of his career possession of ample funds, and influence sufficient to obtain the notice of royalty itself, what must be the struggles of the poor mechanic, who, without means to make the requisite experiments, or friends to countenance him, has to work up-hill against all the vexations and contumely that too often obstruct his efforts!

An instance came to our knowledge within the past week somewhat similar to that of Mr. Warner, the inventor of the destructive projectile. The inventor of an improved method of firing artillery contrived with some difficulty to have his plan submitted to the authorities at the Admiralty. It was approved of, and trials were ordered. The contrivance answered its purpose, very favorable reports of its action were made, yet he could obtain no definite promise that it would be adopted. At length, after waiting several months in suspense, he became disgusted at the delay, and demanded to have his invention returned, with a copy of the report. These he forwarded to the Emperor of Russia, who inspected the invention himself, ordered trials of it to be made, and when found to answer he sent five hundred crowns as a present to the inventor, with an offer of the Imperial patronage if he would remove with his family to Russia.

It is truly disgraceful to the Government of this country, which is mainly dependent for its prosperity on manufacturing skill, and the progress of invention, that there should be no means adopted to give encouragement to the efforts of inventors, or to remove the obstructions that now prevent them from rendering their conceptions practically available.

The first instance within our recollection of an appeal to the law for compensation from a railway company for injuries received by a passenger, has occurred this week. The case was undefended, and it went before a Sheriff's jury to assess the damages, which were laid at £3,000; but a verdict was taken by the consent of both parties, without entering into the details of the occurrence, for £210. We are glad that the case has been brought before the public, though it is to be regretted it was not fully gone into, that the example it is calculated to afford might be more generally known and more deeply impressed on the public mind. It is desirable that railway companies, more especially, should learn by experience that they are equally liable with common carriers for any damage proved to be occasioned by neglect or want of due precautions, either in their own arrangements or by the misconduct of their servants. The Directors of the Eastern Counties' Railway, against whom the action was brought, did not attempt to evade by legal technicalities or subterfuge the responsibility to which they are equitably as well as legally liable. They at once admitted the right to compensation; the only question being the amount, which was ultimately settled without going to the jury.

This case will form an important precedent in future proceedings of a similar kind. It will afford the public a knowledge of their just claims, and it will put the directors of railways on their guard to prevent a reasonable imputation of blame should any accident occur.

The neglect attributable to the Directors of the Eastern Counties Railway in the case in question, was the appointment of a reckless engine-driver,

who, notwithstanding the cautious given him to shut off the steam in going down the incline at Brentwood, proceeded with the full steam power, and overturned the carriages when going at the rate of sixty miles an hour.

The verdict of the coroner's jury on the bodies of the four persons who were killed by the same accident that caused Mr. Morse's injuries was "accidental death, with a deodand of £125 in each case." There was no flagrant want of attention proved against the directors, but they have been very properly made answerable for the misconduct of their servant, who himself fell a sacrifice to his culpable temerity.

Railway directors will be taught by awards similar to these against the Eastern Counties company, that it is miserable economy to appoint men of inferior station and of doubtful trustworthiness to situations so responsible as that of a locomotive engineer. This compensation case, and the others that will no doubt be founded upon it, may, we hope, be the means of hastening the appointment of Captains of trains; which arrangement, we continue to think, must be ultimately adopted, in order to give the requisite confidence to the public that the necessary precautions against danger have been adopted.

We cannot let this occasion pass without again noticing the extreme absurdity of the law which makes railway companies responsible for minor cases of injury, but leaves them entirely unscathed when the injury occasions death; unless, indeed, it be proved that the calamity was entirely fortuitous, and for which no one can be blamed! In that case, the law renders railway companies available to any amount that a coroner's jury may think fit to award in the shape of deodand; but in the case before us, the lives of the passengers killed were estimated by the coroner's jury at little more than half the amount which the railway directors agreed to pay as compensation for personal injuries and inconvenience.

NEW INVENTIONS.

MACHINE FOR EXCAVATING.

We last week translated from the *Moniteur Industriel* an account of a locomotive excavator worked by steam; we now take from the same paper the following account of an excavating machine worked by hand. "M. Labbé is an ingenious mechanician whose creative mind grasps the most difficult undertakings, though at the risk of failure. It is known that men of this description are usually little appreciated, though they lead the way to new discoveries, and though it is to them we are indebted for almost every thing that we know. M. Labbé has just invented and constructed a new machine for excavating, that is, an apparatus by means of which the soil, in whatever situation, may be raised 10, 15, or even 20 metres with the greatest facility, and with a great saving of power. The soil may be lifted up to that height, and thence conveyed wherever it is required. We will endeavor to explain the mode of its operation. In the first place, four or five wagons or boxes attached by an endless chain run on a horizontal railway in the form of an ellipsis. This chain is put in action by two men, by means of a handle ingeniously contrived. These boxes in passing under a hopper, on which the earth is thrown that is to be raised, are laden alternately by opening a trap door. As soon as they are laden, they proceed in a circular line round half the ellipsis, and arrive in succession just above other boxes, into which by a very simple mechanism they deposit their contents. These other boxes by means of an endless chain, in the manner before described, and connected with the first, are raised in succession to the height required. When they have reached it the earth which has been raised can be thrown down with the greatest ease, or conveyed into any other place. The whole apparatus is supported on small wheels, and advances or is drawn back at will, as necessity requires. It will be perceived that the first idea of M. Labbé's machine is simple, rational, and entirely adapted to the object to be obtained. But surprise and astonishment is not so much excited by the first idea, as by the details, by the number of small mechanical problems that it has been necessary to solve in order to combine and to bring into operation the endless chains, the boxes, and the wheels of the wagons, to effect the different operations, the loading, and the unloading, the raising of the earth, and all accomplished by two men turning a handle. We do not hesitate to say, that all experienced men on seeing this machine in operation, and on studying its mechanism, will agree that its inventor has taken every thing into consideration, and that to have accomplished what he has it was not only necessary to be acquainted with every thing that had been done previously, but also to be able to imagine and to carry into execution all the requisites for giving effect to the original idea. Many statements have been made of the great saving of expense which would result from the use of the *Terrassier Labbé* in the construction of canals, the fortifications of Paris, &c., &c. We shall not enumerate them, not being able to test their accuracy. All that we are able to announce is, that from the experiments which we have witnessed, we are much disposed to think that the machine of M. Labbé will be of very great service."

NEW WOOD PAVING.

A select number of scientific gentlemen were invited on Saturday to attend a private view at the Polytechnic Institution, of an experimental wood pavement, upon a construction altogether different from that of any in present use. Mr. Benjamin Rankin is the patentee of the invention, and Messrs. Esdailes and Margrave, proprietors of the City Saw Mills, on the Regent's Canal, are the manufacturers and licencees. This wood pavement is different from any yet offered to the notice of the public, the intention of its contrivance being to combine all the existing benefits of other plans with that *sine qua non* in a metropolis like London, where the traffic is incessant, of a secure foothold for the horse in all states of the weather. The pavement is constructed of two sets of blocks, every block of each set being exactly alike, and the whole of the form of a wedge, each being provided with grooves and tongues to fit them firmly together. One set of these blocks constitutes the base of the pavement; these have their points upwards. The other set forms the working surface; these have their points downwards, the upper blocks fitting into the lower ones by means of the grooves and tongues already mentioned, and firmly interlocking the whole into one solid mass. A strong framework of wood, representing the kirbs of a street, was provided. Into this the separate blocks were as rapidly laid as they would be in the course of paving streets; the whole being keyed with the surface blocks. The two ends of the frame, to which there was no bottom, were then placed upon the steps, and efforts were made to force the pavement downwards, but to no purpose, as pressure upon the surface appeared to consolidate it more firmly than before. It is said by the patentee that no one block of the structure can be forced below the surface unless by the destruction of the block itself.

LOCOMOTIVE FOR COMMON ROADS.

A gentleman residing at Southwell, Dr. Calvert, has constructed a machine, which he purposes to call "The *Alternate*," because he rides or walks in turn according to the ascending or descending inclination of the road he travels. By merely rising from his seat, and throwing part of the weight of the body upon the hands placed on a guiding bar, he *walks* with less fatigue than he could do without the machine, especially where the ascent is not very steep. On descending he sits down and *rides* at his ease with considerable speed. The propelling action (the most powerful that can be exerted, and one of the most lasting) is that of rowing.—*Nottingham Journal.*

PAPER FROM ASPARAGUS.

The *Fanal*, Brussels paper, gives the following account of the manufacture of paper from the stalks of asparagus, which is stated to be carried on extensively in that city:—"We have pleasure in hearing that one of the most famous paper manufacturers, M. Diercks, of Ghent, has collected all the stalks of asparagus that come from the tables d'hôte and great houses of the town, in order to convert them into paper. Every evening two or three loads of these fibrous stalks are carried to the rolling mill, and thence to the stamping machine, which triturates them in the course of a few hours. The kind of paste which is thus produced does not require bleaching. It is put into a tub, and taken to the paper-making machine, from which it issues converted into excellent white paper, the expense of which is not half that of paper made from rags. We have no doubt that when this secret is once known, it will be eagerly appropriated by all large manufacturers. Asparagus mixed with the pulp of beet-root produces a kind of paper, which is even superior.

A STEAM ORGAN.

M. Lax, jun., has just invented a steam-organ, which can be heard through the extent of a whole province. This instrument, consisting of vibrating plates of metal, is so regulated that it is acted on by steam of four or five atmospheres of pressure. These plates are merely very large steel bars, which can only be made to vibrate by very high pressure steam. This monster organ is fitted for popular solemnities and inaugurations of railroads. It may be placed upon a wagon in front of the engine, which will supply it with the same steam that moves the pistons in the cylinders. The sound of this stupendous instrument would overpower the noise of the issuing steam, the working of the wheels, and the roaring of thunder.—*Le Fanal.*

SCIENTIFIC CORRESPONDENCE.

STEAM WORKED EXPANSIVELY.

To the Editor of the "Inventors' Advocate."

SIR,—I beg to hand you the letter to which I referred you last week, the whole, or any portion of it, is at your disposal.

You will perceive from my last communication, that I am at present undecided on the subject of working steam expansively; and for this reason, that the deductions of theory do not appear to be borne out in practice; when theory and practice at all approximate I am not sceptical, but in the expansive system there are some anomalies that I cannot account for, and wish to await the results of some experiments I am now repeating, before I would give a decided opinion either for or against.

According to theory, and supposing that two volumes of steam, at atmospheric pressure, when compressed into one, will produce 15 lbs., steam worked at the following pressures, in the same cylinder, should give the results annexed, and in each case the measure of steam admitted should

expand to the whole contents of the cylinder, and be then equal to atmospheric pressure.

Lbs. pressure above the Atmosphere.	Proportion of Stroke when cut off.	Mean Pressure.	Vacuum.	Whole amount of force per square inch on the piston.
0	whole	0·	14	14·
15	$\frac{1}{2}$	11·25	14	25·25
30	$\frac{1}{4}$	16·875	14	30·875
60	$\frac{1}{8}$	22·5	14	36·5
120	1-16	28·125	14	12·125

Now in *practice* these results are not obtained, for in some comparative experiments I have made with the same engine, doing *the same amount of work*, rather less fuel was required when it was working with steam from 1 to 5lbs. throughout the stroke, than when working with steam from 40 to 50 lbs. flashed in immediately on the crank passing the centre, and consequently only filling the slide case and the small space between the cylinder cover and the piston; the vacuum and every other circumstance being, as nearly as possible, the same.

This is the enigma; and until I can discover some satisfactory solution to it, I must consider myself justified in withholding my opinion in favor of working steam expansively.

I am, Sir, your obedient servant,

Norwich, 14th June, 1841. F. Ham.

[The following is an extract from the letter referred to by Mr. Ham, and addressed by him to the President of the Institution of Civil Engineers. The letter is dated May 2d, 1839.]

"Sir,—I am induced to address the Institution in reply to Mr. G. H. Palmer's paper, since it appears, from your having considered it of sufficient importance for insertion in the 2d volume of your "Transactions," that the recorded duty of the Cornish engines is *still* a matter of surprise, in fact, Mr. Palmer seems more inclined to doubt the accuracy of the accounts, than that of his data.

"That it is possible to raise 120,000,000 lbs. one foot high, with one bushel, or 94 lbs. of coal, I do not for a moment doubt; and moreover venture to say, that even that duty, enormous as it appears, as contrasted with the ordinary duty of a Boulton and Watt engine, is not the maximum the Cornish engines might be made to perform; this assertion but ill accords with Mr. Palmer's calculations, which are correct, from the data he assumes, viz. that 7 lbs. of coal are required to convert 1 cubic foot of water at 40° into atmospheric steam, in the boiler of a Boulton and Watt engine, as at present constructed; but which is very wide of the mark as regards the effect of the combustion of 7 lbs. of coal under different circumstances; for instance, I have proved by several experiments made some years since, that 7 lbs. of coal will convert into atmospheric steam at *least three* cubic feet of water at 40° under peculiar management, which simply consists in exposing a much more extended surface to its action than is usual, and in diminishing the *rate of combustion*; as an example, the same quantity of fuel maintained in combustion for 12 hours, will evaporate at least *three times* the quantity of water than it would if consumed in 2 hours, other circumstances being the same; this is an effect I have for some years daily produced in an ordinary steam-boiler, and have not the slightest doubt but that with more complete apparatus, and a still slower combustion, nearly double that amount might be obtained; here then is a solution to the problem,—the Cornish engines very seldom if ever work up to their speed, frequently to not more than a third, the fires are then damped up, slower combustion ensues, and hence the result; with the most complete Boulton and Watt or high pressure engine, the case is different, rapid combustion is required, in the absence of an extensive boiler surface, to supply the requisite quantity of steam; and promoted to a most wasteful extent, by tremendous chimneys, fans, &c. Intensity and consequently radiation are certainly increased by these means, but neither iron nor copper conducts it in any thing like the same ratio; in fact, I believe, that when the boiler is highly heated, the water is actually repelled from the surface of the plates, by an atmosphere of caloric, from its not being able to absorb it with sufficient rapidity; I am moreover confident, that were slower combustion practised, fewer explosions, and a mere tithe of the present destruction of boilers would result, independently of its effecting a considerable saving in fuel, which would most amply repay for the capital invested in extra boiler room.

"Mr Palmer's paper has certainly been beneficial in exciting inquiry, and has induced me, as I dare say it will others, to institute a set of experiments, on the relative effect of fuel in evaporating, under different rates of combustion, and I therefore purpose, as opportunities occur, to investigate the matter in as philosophical a manner as my experience will enable me."

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING JUNE 21, 1841.

Monday	Statistical Society	8	P.M.
	British Architects	8	P.M.
	United Service Instit.	9	P.M.
Tuesday	Medico-Chirurgical Society	8½	P.M.
	Zoological Society	8½	P.M.
	Royal Botanic Society	8	P.M.
Wednesday	Microscopical Society	8	P.M.
	Medico-Botanical Society	8	P.M.
	Royal Soc. of Literature	3	P.M.
Friday	Linnæan Society (President's Soirée)	9	P.M.
Saturday	Mathematical Society	8	P.M.

ROYAL INSTITUTION.

June 11. Friday Evening Meeting.

Mr. Fownes delivered a lecture "On the Principles of Chemistry as applied to Agriculture." The British Association some few years back requested Professor Liebig, of Giessen, to prepare a report on the state of Organic Chemistry—a part of which has already appeared on the Continent, and has been translated into the English language by Dr. Lyon Playfair. This the lecturer duly acknowledged, and from the data furnished in the above work, nearly the whole of the facts were deduced. Soon after the publication of the translation of Liebig's work, we gave a full abstract of the leading points touched upon by the author in our columns: we shall now only give a brief report of the principal facts detailed by Mr. Fownes in his discourse.

The subject embraced the history of soils, germination of seeds, and other important details connected with the principles and practice of agriculture. The hardest substances in nature in the course of time become reduced to powder, or disintegrated, partly by chemical and partly by mechanical means: the great agents in producing these change are, water impregnated with carbonic acid—the excreted matter from roots—and the action of roots themselves upon the soil.

The constituents which enter into the composition of arable land, are sand, clay, and lime. When the former and the latter occur in a state of purity the soil is barren, and necessarily so; the fertile soils owe their origin to the clay, or argillaceous earth. This clay is produced by the disintegration of minerals containing alumina, by the action of the weather principally. The most common minerals which hold alumina in their composition are the potash and soda felspars, labrador spar, mica, and the zeolites; and these are, more or less, met with in granite, gneiss, micaslate, porphyry, clay-slate, grauwacke, and in the volcanic rocks, basalt, clinkstone, and lava. Of all the rocks the mountain limestone contains the greatest quantity of argillaceous earths. The Jura limestone contains from 3 to 20 per cent., while that from the Wurtemburg Alps from 45 to 50 per cent. It was stated that these aluminous earths depend on their fertility on the presence of the alkalies, potash and soda, and on this principle it is that agriculturists have found it advantageous to add these substances to their lands. The sandy soil, or sand, can be produced in two ways, either by the disintegration of granite, &c., and carried down by streams to other situations, in which case the grains are more or less angular in their character, or it may be formed by mechanical attrition, as recognised on every seabeach. But in whatever way soil is produced, it owes its character to the *humus*, which is the product of putrefaction of vegetable matter: this *humus* becomes converted into *humic acid*, and is soluble only in 1-2,500th part its weight of water.

It is the opinion of Liebig, that vegetables derive more nourishment from the air than they do from the earth, and this nourishment is offered to them in the atmosphere in the form of carbonic acid, the result of various operations going on in nature, such as respiration, combustion, &c. Liebig asserts that although the absolute quantity of oxygen contained in the atmosphere appears very great when represented by numbers, yet it is not inexhaustible. One man consumes, according to this philosopher, 45 Hessian cubic feet of oxygen in 24 hours; 10 centners of charcoal consume 58.112 cubic feet of oxygen during its combustion; and a small town like Giessen (the residence of Liebig), with about 7,000 inhabitants, extracts yearly from the air, by the wood employed as fuel, more than 1,000 millions of cubic feet of this gas. The air contains *in maximo*, 66 parts in 100.000 of carbonic acid gas, and 21.000 parts in 100.000 of oxygen gas. A man consumes in one year, 166,075 cubic feet of oxygen gas (or 45,000 cubic inches in one day), according to Lavoisier, Seguin, and Davy; a thousand million men must accordingly consume 166 billion cubic feet in one year; this is equal to 1-1,000 of the quantity which is contained in the air in the form of carbonic acid. The carbonic acid in the air would thus be doubled in 1,000 years, and man alone would exhaust all the oxygen, and convert it into carbonic acid in 303 times as many years. The consumption by animals, and by the process of combustion, is not introduced into the calculation.

Mr. Fownes briefly explained the production of this carbonic acid, and gave the received opinions as to the mode in which the vegetable kingdom received the greatest quantity of its food from it, viz., by the action going on in the leaves, &c., under the action of the sun's rays, the carbon of the carbonic acid is decomposed, and deposited, which augments the substance of the vegetable, while the oxygen is restored to the air in a pure state, fit for the respiration of animals.

The chemical examination of the atmosphere has only very recently shown that it contains *ammonia*, and this is deposited on the earth by the rain; and provided a pound of rain water as has been shown contains only one quarter of a grain of ammonia, then a field of 40,000 square feet must receive annually upwards of 80 lbs. of ammonia, or 65 lbs. of nitrogen. From experiments which Liebig has made he has detected the presence of ammonia in rain water beyond all doubt. The water was collected some 600 paces S. W. of Giessen; when several hundred pounds of it were distilled in a copper still, and the first two or three pounds evaporated, with the addition of a little muriatic acid, a very distinct crystallisation of sal-ammoniac was obtained; the crystals had always a brown or yellow color.

The source of hydrogen, nitrogen, and other elements were alluded to, and several practical facts noticed in connection with the subject, with a view to point out the advantage of a knowledge of chemical science in the ordinary walks of life.

This lecture concluded the Friday Evening Meetings for this session.

ENTOMOLOGICAL SOCIETY.

June 7. W. W. Saunders, Esq., F.L.S., President, in the Chair.

Mr. Marshall exhibited part of a honey-comb entirely destroyed by the larvæ of *Achroia alvearia*, and noticed the peculiarity of the cocoon, which is encased with excrement, as well as the excessive vibratile action of the antennæ of the moth. Mr. S. Stevens exhibited a small collection of Indian insects, including three species of rare and unique *Paussidæ*; also living specimens of several rare British insects, some of which he brought for distribution amongst the members. Mr. Hope exhibited a number of splendid exotic Coleoptera, and Mr. A. White some curious cocoons from Honduras, which he believed to be either those of a Coleopterous or Cimbicideous insect, one end was furnished with a trap door of beautiful construction. He also exhibited a drawing of a fine butterfly from the collection of the British Museum, which he believed to be new. The completion of a monograph on the *Panorpidæ*, by Mr. J. O. Westwood, Esq., was read.

LINNÆAN SOCIETY.

June 15. Bishop of Norwich, President, in the Chair.

A paper was read "On a re-formed character of the genus Cryptolepis of Brown, by H. Falconer, M.D. Sup. Bot. Gard. Saharumpore." Brown refers this genus to Apocyneæ, and places it next to Apocynum, in which he is followed by nearly all subsequent authors. Falconer considers that it has all the accessory stigmatic apparatus of Asclepiadeæ, with granular pollen as typically developed as in Cryptostegia or any other of the Periploceæ, although in a less considerable degree of evolution; and it must therefore rank in that order along with them. The species described was *C. Buchannani, var. reticulata.*

A note was read from Mr. I. O. Westwood on an additional species of *Paussus*. It is described as *Paussus Stevenianus* Westw. He has only seen a single specimen of this species from the collection of S. Stevens, Esq., who obtained it together with some other interesting insects from India, without any indication of its precise locality. It is most nearly allied to *P. ruber*, Thunb. An extract of a letter from William Griffith, Esq., F.L.S., to R. H. Solly, Esq., dated 29th March, 1841, was also read, on some additional observations on the fecundation of the ovule of *Loranthus, Santalum*, and other allied genera, a more detailed account of which he promises to forward on his arrival at Calcutta. Mr. Cameron exhibited a flowering specimen of *Campanula thyrsoidea* from the Birmingham Botanic Garden, and Mr. John Anderson the *Dianthus plumarius* from Ludlow Castle, which he considers to be the parent of all the varieties of cultivated Pinks. The President then nominated the Vice-Presidents for the ensuing year, viz, Mr. R. Brown, Mr. A. B. Lambert, Mr. E. Foster, and Dr. Horsfield.

The meetings of the society were then adjourned until after the summer recess.

LONDON ELECTRICAL SOCIETY.

The subjects laid before the members at the last ordinary meeting were numerous and replete with interest, and gave proof of the favorable progress making by this society. The following communications were read:—1. A letter from Martyn Roberts, Esq., describing "Experiments which show some points in which heat and electricity differ." When a Bennet's electrometer was placed at a distance from a charged conductor, its leaves diverged, but collapsed when the charge was withdrawn. This was the case, too, when glass was interposed; but when a spark was communicated to the electrometer, the leaves remained separated after the charge was drawn from the conductor. These familiar experiments, it was contended, show that electricity will not radiate after the manner of heat, but can be transferred only by actual connection. 2. A translation of a paper by M. Jacobi. It was written in connection with observations made by M. Becquerel upon the nitric-acid battery. Becquerel thinks that the great superiority of its power is due to the reaction of the nitric-acid on the acid-water, compared with the similar reaction of the sulphate of copper in ordinary batteries. Jacobi grants that this reaction does produce some effect, but nothing in comparison to the great superiority obtained. He gives interesting observations in proof of this, for which, however, we must refer our scientific readers to the "Proceedings of the Society." 3. An account, by W. H. Weekes, Esq., of an atmospheric electrical apparatus, erected over the town of Sandwich, consisting of 365 yards of wire attached to the spires of two churches, and supported midway by a high chimney. It contained several particulars connected with the erection and insulation of this great extent of wire; also the means by which the experimenter had obtained a mastery over the formidable contents of the lightning cloud, together with the mode of producing the less splendid though not less interesting effects from the light summer cloud, or even from the cloudless atmosphere. 4. Extract of a letter addressed to J. P. Gassiott, Esq., from H. Collan, Esq., describing experiments made in electrotyping a Daguerreotype plate. Plates of copper were exhibited which had been produced in March, 1840, and since then neglected. On one was visible by careful observation a correct representation of parts of a cathedral. What is remarkable in connection with this is, that the picture was not visible until the plate had been exposed to the light of the sun. 5. The secretary laid before the society "A register of the electric state of the atmosphere, in relation to its meteorological phenomena for the month of May, 1841, from observations made by means of Mr. Weekes' apparatus, already described." This register, which is replete with interesting information, will be printed in the first part of the "Proceedings." It was stated that this is not an isolated paper, but will be regularly followed by others for each month. Before the meeting adjourned, the secretary stated that amongst the papers he was compelled to defer until the next meeting was one from their eminent member, Andrew Crosse, Esq.

THE PROGRESS OF INVENTION.

The members of the Belper Mechanics' Institution, to the number of about three hundred, paid a visit by railway to their friends, at Chesterfield on Wednesday week. A special train was placed at their disposal by the directors, and the party started at twenty minutes to three o'clock, arriving at Chesterfield about half-past three. Here they were joined by the members of the Chesterfield Institution, and a number of ladies and gentlemen, and a procession being formed, the visitors and their friends, accompanied by numerous banners and bands of music, proceeded to the Assembly Rooms, where tea was provided for about five hundred. E. T. Coke, Esq., presided, supported by R. Daniel, Esq., mayor of Chesterfield, and other gentlemen. Several excellent addresses were delivered in the course of the evening, from one of which we give a short extract. Mr. Busby, in expatiating on the rapid progress of invention, made the following well-timed allusion to Mr. Stephenson and the railway system:—"Mr. George Stephenson (who was present on the occasion) presents a living proof to the mechanic of the power of industry, the resources of a practical and reflecting mind, and the dignity of an unvarnished simplicity of character. Known as he is, wherever steam and iron have opened the swift lines of communication to our countrymen, and regarded by all as the father of railways, he might be called, in the most honorable acceptation of the term, the first and greatest *leveller* of the age. To us, in whose days the system of railways has been realised, who have seen the commencement and result of the experiment of locomotion by steam, it might be curious to look back upon the times when such a power was undreamt of. Sixty years ago, Sheridan, the brilliant wit of his age, in his admirable and familiar drama of 'The Critic,' had introduced the well-known character of 'Puff;' a gentleman whose genius lay in the manufacture of romantic paragraphs and insidious advertisements. Full of business, he hurries away from the scene, apologising for the abruptness of his departure, for he has to announce 'a very ingenious design for a self-acting air-pump, to be fixed in the confined streets, which is to supersede the necessity of country excursions for the benefit of health; and here (he exclaims) is an invention for running our mail coaches by steam, and lighting them by gas.' It is not (continued Mr. Busby) only for the purpose of raising a laugh that I make this quotation; its practical bearing is to show us how, in the progress of improvements, one age is incapable of imagining the systems of succeeding ones. The ludicrous and impracticable speculations which the wit of Sheridan strained to devise, have been brought already into practical operation. If we have not actually the self-acting air-pump, a system of ventilation is introduced in our large towns, by throwing down the wretched and squalid haunts of misery and disease, and building wide and healthy thoroughfares in their stead, by establishing parks and promenades, and bringing the delights of the country almost within the walls of our towns. The other scheme has been even more literally fulfilled; day by day are our mails wafted by the wings of steam, and whether or not they are actually lighted by gas, depends only upon the convenience, and not the practicability of the plan. Inventions that to us appear equally visionary, may find their bearing in future times, and being, as they must be, the offspring of intelligence, it is a wise and benevolent duty to widen the sphere from which they are to spring, to facilitate the development of faculties, which are always pregnant with important results."

EXPERIMENTS WITH NITRATE OF SODA.

BY THE EARL OF ZETLAND.

I had two fields of wheat at Marske sown with nitrate of soda. Owing to the very bad seed-time, last year, these two fields were not sown with wheat till January. The nitrate was put on about the 13th of May. Both these fields were reaped within a few days of the time that the earlier sown corn was reaped. The straw was abundant, and one field produced 42 stooks per acre, and the other 45 stooks per acre. It is estimated that they would both yield about the same quantity of grain, viz., about 37 or 38 bushels per acre; the straw in one field being coarser and taking up more room than the other. I do not think these fields produced more wheat than my other wheat fields at Marske; but then the other fields were in better condition, and had been ploughed with the subsoil plough, which I believe, on the Marske land, produces a very great effect. The fields sown with nitrate had been heavily cropped, were rather in an exhausted state, and would not have been sown with wheat if it had not been for the convenience of bringing a farm, which I had just taken in hand, into a regular rotation. I believe my wheat land at Marske produced at least 10 bushels an acre more than the average of my neighbours on the same sort of land. I have not tried the nitrate on oats, but Mr. Hart, a very good farmer on the Gisbrough estate, told me that he tried it on one ridge of oats, and that ridge produced three sheaves to two sheaves on the adjoining ridge. Mr. Vansittart tried it on a whole field of oats, which field had grown wheat the preceding year. He had a remarkably good crop of oats over the whole field, when he had only a right to expect a very moderate one. I have not tried it on any other crops besides wheat and grass this year. Last year I tried it on turnips, and thought it did no good. Mr. Van-

sittart tried it on turnips this year, with dung, on strong land, and his opinion is that it did harm to turnips. At Aske I tried it on a very fine meadow field—a good loamy soil, well drained, with sandy stone and limestone below. Another part of the field was manured with a compost of lime and salt; the result was, in weight of grass—

24 square yards .... Nitrate of Soda....136 stone.
.. .... Lime and salt.....100 do.
.. .... Without manure... 96 do.

The above was weighed immediately after it was cut. I believe that lime and salt, mixed, are of little use, and that, separate, either would have more effect. This does not show so great an increase as was produced here last year, when the weight of grass was more than doubled; but the land at Aske is much finer and richer land than that on which it was tried here.

THE COLLECTION AND PURIFICATION OF RAIN WATER.

(By Mr. John Mearns, F.H.S.)

Rain-water is generally supposed to be unpleasant to the palate; if, however, it be carefully collected in the first instance, and properly filtered, it is found by experience to be the pleasantest water that can be drunk. I have seen the rain-water from the roofs made to pass through a canvass strainer, in texture like that of a cheese-cloth, into the water-butt; there it deposited any impurities which were not caught by the cloth; and every day a few gallons were filtered by one of the newly-invented portable apparatus. The water was perfectly bright and pure, its flavor (if the term be admissible) was delicious; in fact, it was the finest water I ever tasted, not even excepting that of pellucid mountain streams, or the much-famed Cumberland lakes. Nothing of the vapid insipidity of common rain-water remained, nor will that ever be perceived if the fluid be properly collected and strained. If I were addressing this to a resident of that chalky but most fertile granary of the metropolis, the Isle of Thanet, at the north-east point of Kent, it would be sufficient to mention a rain-watertank, to insure his instant assent to my unqualified assertion, that a greater convenience can scarcely be attached to a homestead. In some parts of Berkshire I find tanks of the kind are in use; but with the exception of these two districts, the real filtering rain-water tank appears to be scarcely known. The reservoirs or tanks for rain-water are generally constructed of cylindrical form, somewhat resembling a shallow well; they are sunk in the ground, and should be built with stone, made secure by being jointed with Roman cement; but good mortar, made up with two or three parts of finely-sifted coal-ashes, and one part of the very best lime that can be got (particularly that from thoroughly burnt limestone, not the magnesian), will answer extremely well. If it is intended for the nicest culinary purposes, the internal surf ce must, however, be accurately and entirely covered with a coating of the cement, of at least one-third to half an inch in thickness. No bricks ought to be used, even if coated with cement, as they have the property of rendering soft water hard, and for a considerable time after the tank has been made, if the bricks were new. From 1,000 to 5,000 gallons of rain-water may be thus collected, and secured from dirt and dust; and if the fluid, in passing into the reservoir, be made to run through a filter prepared by putting into a deep tub a quantity of well-washed sea or river sand, to the depth of a foot or more—over that a stratum of bruised good charcoal, and, finally, a layer of clean gravel-stones, it will be effectually sweetened, and purified from all extraneous matters. This tub might either be bored at the bottom with an auger-hole to let the water pass, by means of a broad funnel, into the tank, or be furnished with a false wooden bottom pierced with holes; the intervening space would then be filled with water, when a common tap, passed through a stave just above the true bottom of the tub, could convey it away into its under-ground recipient. A tank, I have stated, is built in the ground; the opening at top is always secured either with flat stones, or with a brick arched dome, in the centre of which a stone is let in and fitted in a groove. This stone of course is moveable, and is occasionally taken up when it is found needful to clean out the tank, but if the purifying filter were employed, the water would be so effectually cleansed that little or no deposit could ever be formed, and it therefore would keep well for a very long period. A few pounds would cover the first expense of a medium-sized tank; and I believe that a sum under £10 in the whole would also furnish it with a pump and pipe, by which this purified and salubrious water could be introduced into the dwelling, the hothouse, or the greenhouse, and be thus always ready to be applied to the several purposes of domestic economy for which soft water is so indispensably requisite. Under common circumstances, nine-tenths of the rain-water that falls on every dwelling, hothouse, and their offices, are wasted; by the plan suggested, a large portion of it would be saved, and be cheaply rendered available in the best and most advantageous manner.

THE SUGAR PRODUCE OF JAVA.

The treaty of commerce between France and Holland, lately so much a subject of discussion with the French Legislature, as well as the attention drawn to the article of sugar by the debates in this country, will render a description of the position of Holland with respect to its manufacture a matter of some interest. According to a German newspaper lately published, in which the subject is considered at great length, Holland is in the anomalous position, that while her sugar manufacture is too extended for present circumstances, she is compelled to maintain it to its full height. She uses in manufacture every year above 1,200,000 zentner (a weight of 100 lb.) of raw sugar from her colonies, but consumes no more than about 190,000 lbs., and is therefore obliged to export 1,010,000 lbs. It is thus obviously the interest of Holland to encourage the exportation trade as much as possible; but still there is a danger that she will not be able to get rid of all her superabundance, notwithstanding the powerful assistance of her Government. Here she feels the loss of Belgium, which has reduced domestic consumption one-half, while the production of sugar in Java has gone on increasing, and the manufacture in Holland itself has been pursued on a scale too large for her wants. Already the evils of this position have made themselves apparent by failures in Amsterdam and Rotterdam, and though an obvious remedy would seem to present itself in the reduction of the manufacture, this expedient is attended with more difficulties than are apparent at first sight. The chief revenue of Java is derived from its sugar; to that the whole system of Dutch colonial government is directed, and the production has increased to an extraordinary degree, while it is yet impossible to say whether the *maximum* has been attained. On this production depends the internal manufacture and commercial navigation of Holland, and any diminution in this respect would produce a most injurious reaction against two important branches of industry. Hence the necessity which Holland feels for keeping up her sugar manufacture in spite of every disadvantage, and, as far as her colonial produce goes, it seems she has no rival to fear in the export of her sugars, for the French colonies do not produce enough for consumption in the mother country, and the English colonies produce scarcely more than is required here. The great competitors she has to fear seem to be the vendors of beet-root sugar in the German market, and against this article all her endeavors must chiefly be directed.

Examining the production of Java more in detail it is to be remarked, that the inhabitants are obliged to cover a fifth part of their estates with sugar, with which they pay their rent. Produce is encouraged by rewards offered by Government, and the planters who produce more than the fifth are entitled to the value of the extra quantity. The cane is prepared in private factories to which money is advanced by Government, who are repaid in raw sugar. The whole system works well, while this price pays for the process; but when it becomes too low a depression is felt on every side. Formerly the price was fixed by the Government at 15½ florins per pikol (132 lbs.); but in consequence of the decline of sugar in Europe the Government was compelled to lower it to 10¾ florins, to the great loss of the planters. This reduced the selling price from 11 florins 74c. to 8 florins 30c. per zentner. Recent investigations in France have shown that a manufacturer in the colonies will, under the most favorable circumstances, produce a zentner of rough sugar at 25f.; but in general cannot produce it under 28f., which is nearly equal to the Dutch price of 11 florins 74c. The freight and expenses to the French warehouse is about 13f., while those to the Dutch warehouse are about 5 florins 14c., so that the price of the French sugar is increased to about 14f., and that of Holland to about 36f. The zentner of beet-root can be manufactured in France at about 44f., which at first would be the price of that manufactured in Germany It is to be seen from these details that Holland rules the market by a forced production, and acts on a principle totally different from any which can be enforced in the cultivation of the beet-root. The Colonial Government compels the production of a certain quantity of sugar at a price fixed by themselves, and under all circumstances, while the state of circumstances will influence the beet root and its manufacture.—*Times.*

SCIENTIFIC MEMORANDA AND NOTES ON ART.

Proposed Parachute Signal for Railways.—Professor Partington, in a lecture on the steam-engine delivered last week at the Literary, Scientific, and Mechanical Institution of Newcastle-upon-Tyne, recommended as a prevention of accidents on railways, that as soon as any circumstance occurred to prevent a train proceeding, a rocket-parachute should be sent up into the air, which would remain for a considerable time, and show to the other trains which might be travelling on the same line that there was danger on the road. When speaking of parachutes, the Professor said they might be used as fire-escapes; and he would not hesitate himself to leap a considerable way with a strong umbrella in his hand.

The Aurora Borealis.—Mr. J. H. Maverly, of the Royal Academy, Gosport, says—"It is not unphilosophical to ascribe the cause of the *Aurora* chiefly to magnetic principles, that is, to a superabundance of elastic gaseous matter, elicited by the agency of some other gaseous fluid in the vicinity of the magnetic poles, and propelled towards the Equator in the various interesting forms in which we see the *Northern Lights.* Moreover, if *electricity* be, as has been considered by many, synonymous with *magnetism*, and *vice versa*, many chemical and electrical experiments may be made to show its resemblance to the bright yellow gaseous fluid of the *Aurora Borealis;* and, as electricity is known to pervade the atmosphere to a considerable height above the earth's surface, it would not be a far-fetched hypothesis to presume that the Aurora Borealis is caused by the affinity of the two gaseous fluids for each other, in the occurrence of any natural change made from their quiescent or latent state, and thus forming the united agency of magnetism and electricity, while producing the sublime phenomenon in high northern cold latitudes, where electricity is so much more abundant than in low damp parallels. Even the appearance of the meteors at the time of the Aurora argues in favor of electrical agency; for what are common meteors and ascensions, both in the lower and upper medium of the atmosphere, but electrical light, generated by an admixture of elastic gaseous fluids of heterogeneous qualities?" Mr. Maverly then describes the effects of Auroræ Boreales, to be *rain and wind,* and which generally come on in twenty-four hours after their disappearance.

Liepmann's Copies of Paintings.—Within the week, one of Herr Liepmann's copies of oil pictures has been submitted to us, by a gentleman who conceives that the representations of our correspondents have flattered an invention, which, according to a specimen forwarded from Berlin at his request, is a total failure. As it happens, we have been able to submit the copy in question, which is certainly unsatisfactory, to the writer of the letters from North Germany, whose account of Liepmann and his studio appeared in our columns two years ago. It is his decided opinion—from a clear remembrance not only of the Rembrandt head, which first brought the copyist forward, but of one or two smaller essay-pieces, which were also shown by him—that the specimen left at our office has either suffered grievously by transmission, or been issued in an incomplete state; since its

coloring is at once thin, *licked*, and muddy—the outline shining through the superficial flesh tints: whereas the works by Herr Liepmann, which he saw in a dozen Berlin houses, had, to all intents and purposes, the finish, the clearness, and, above all, the body of tone, of the original picture.—*Athenæum.*

Valenciennes on the Cause of the Green Color of certain Oysters.—The reasons given for the cause just cited are very various, and leave much room for investigation. Some authors attribute their green color to their feeding on certain *Ulvæ;* others consider it to depend on the absorption of microscopical animalcules which have received the name of *Vibrio Ostrearius.* After investigating the subject experimentally, the conclusions which M. A. Valenciennes arrives at, are, that the green color of oysters is due to animal matter, which is different from all other green organic substances hitherto noticed. As it is found in the intestinal canal, is it not reasonable to suppose that it is due to a particular state of the bile, thus furnishing a colored substance which is fixed by assimilation on the parenchyma of the two lamellæ of the oyster, on its branchiæ or labial palpæ, by a physiological phenomenon analogous to that which M. Flourens has observed connected with the assimilation of madder, which colors only the bones of animals, whilst the cartilages, ligaments, and tendons remain white. This green colored substance above noticed, when submitted to microscopic examination, offers nothing remarkable, but possesses other properties given in detail in the communication.—*Microscopic Journal*, No. 3.

Globules of the Blood.—Carus has observed, that as decomposition of an animal body proceeds, the globules of the blood in the capillaries first become green, and then pass into a green-colored fluid. This he considers as a further proof of the views of Schultz, that the globules of the blood, which are of no further use, become changed into bile.—*Microscopic Journal, No. 3.*

Dutrochet on the Circulation of Chara.—The cause of the circulation in *Chara* has hitherto escaped research; the known moving powers in no way explain it. Dutrochet was lead to investigate whether there did not exist some physical motion, of which the cause was equally unknown, and which might bear some analogy to the motion observable in *Chara.* By reasoning on the subject, he was led to consider that a similarity existed to the movements produced by small particles of camphor when placed on the surface of water, and provided they were motionless, would cause the fluid to be put in motion in their vicinity. Is it not then, says Dutrochet, reasonable to conclude that the moving power which animates as it were the pieces of camphor, is identical to that animating the fixed green globules situated on the internal walls of the central tubes of *Chara*, and from which green globules evidently emanates the motive force of the circulating fluid in contact with them, and that also of the inert corpuscules contained or carried with the fluid? The result which Dutrochet arrives at, after a lengthened and comparative series of experiments, is, that the physiological power (force) producing the circulation of *Chara*, and the physical force which produces the movement of camphor when placed on the surface of water, are identical.—*Microscopic Journal, No.* 3.

Hemp made from Hop Bine.—The bine of hops, boiled in lye till the rind separates freely, may be stripped, and when cool worked like hemp. This is best done by cording, which makes it like cotton.

Rope-making in America.—Mr. Buckingham gives the following description of the rope manufactory at Boston. "The ropewalk of the navy-yard is one of the finest I ever remember to have seen. It is nearly half-a mile in length, two stories in height; it is built entirely of the same beautiful granite as that used in the construction of the dry dock, and is roofed with iron and slate. The window shutters are all cased with iron, and the whole is rendered fire-proof. Some very recent and excellent improvements have been introduced into the machinery here, by a native American engineer, Mr. Treadwell, by which a steam-engine at one end of the building is made to furnish the requisite power for performing all the operations for rope-making, with very little aid from the labor of men, from the first combing of the hemp, and spinning it into threads, to the tarring and twisting the yarn, and the winding of the whole into the hawser or the cable required. I had seen some of the best ropewalks in England, both in the royal dock-yards, and in the private establishments of London, and other parts, but I remember nothing equal to this of Boston, either in the beauty and perfection of the building and the machinery, or the admirable uniformity of strain in every strand and every fibre in the rope produced; or the finished roundness, smoothness, and flexibility of the largest hawsers and cables, of which several were submitted to our examination, both in progress and completed."

Edmund Spenser.—The literary world will be glad to learn that the locality of the family of the illustrious author of The Faëry Queen has been ascertained. Mr. F. F. Spenser, of Halifax, in making some researches into the ancient residence of his own family, has been fortunate in identifying it with that of the great Elizabethan bard, and, we are informed, is about to lay the particulars before the public. The little rural village of Hurstwood, near Burnley, in Lancashire, is the honored locality, and in the romantic Alpine scenery of that neighbourhood it is probable Spenser took refuge, when he was driven by academical disappointments "to his relations in the north of England." The family of that great poet appear to have resided at Hurstwood about 400 years—that is, from the early part of the reign of Edward II. to the year 1690.—*Leeds paper.*

Glass Cloth Weaving.—A most ingenious artist, a Mr. Barker, from Ossett-street side, is now exhibiting the process of the above novel species of manufacture, in a room in the Philosophical Hall, Halifax. He has lately forwarded a most splendid apron, and a pair of slippers, to her Majesty the Queen, which have been most graciously received, with the strongest approbation. We have seen some very beautiful specimens of the ingenious inventor's skill, and consider them as splendid novelties. We particularly noticed a piece of waistcoating, two and three quarters yards long, and half a yard in width, which he states to be the first of the kind he has been able to bring to any degree of perfection, and has been woven in Huddersfield. It is beautifully figured like damask or fancy work. One remarkable circumstance in glass cloth is that it will stand washing. We were shown a piece of pure white, which has six times undergone that process. We hope the ingenious and persevering man who has already spent two years and a half in bringing his invention to a state fit to meet the public eye, will reap his reward for his invention.—*Halifax Guardian.*

VARIETIES.

Public Bills.—From a Parliamentary return, we find that the number of public bills brought in during the session of 1840, but which did not receive the Royal assent, amounted to 52, and that the number of public bills that received the Royal assent in 1840 amounted to 94. The number of bills brought in during the present session, and which are now pending, amount to about 70. Twenty public bills have already received the Royal assent during the present session, and several are now waiting to receive it.

The Joint-Stock Banks Deputation.—A few days ago a meeting of the committee of deputies from the Joint-Stock Banks was held, when a resolution was passed not to offer any opposition to the bill introduced into Parliament by the committee on Banks of Issue, nor to take any active part in the approaching elections. The committee of deputies have, however, summoned a general meeting of deputies from all the joint-stock banks in England, Wales, and Ireland, on the 8th of next month, to unite in an applieation to whatever Government may exist at the time for a removal of the legal restrictions on banking-houses having more than six partners.

Large Failure in Wigan.—The Sovereign Mills, in Wigan, which have been carried on since the failure of Mr. Thomas Darwell by Messrs. John Heron and Co., have been compelled to stop. It is said their liabilities amount to upwards of £100,000, and some accounts make them as high as double that sum. By this stoppage great numbers of poor people are thrown out of employment in Wigan.

Distressed Hand Loom Weavers.—We learn that the number of hand-loom weavers engaged in breaking stones amounts now to nearly 200.—*Glasgow Courier.*

Booksellers' Provident Institution.—The annual festival in support of the funds of this institution took place on Wednesday at the Trafalgar Tavern, Greenwich. The chair was taken at 5 o'clock, by Mr. J. Murray, of Albemarle-street, who was supported by Mr. Alderman Magnay and Mr. Von Raumer. Upwards of 130 persons connected with the book trade were present. Mr. J. Murray observed that the funds were in a flourishing state, and that the expectations formed at the foundation of the society had been fully realized.

The Census.—The persons appointed to collect the census papers last week experienced in several places in England considerable obstruction, and some parties have been summoned before the magistrates and fined for refusing to make out a list of the persons residing in their houses. In Ireland the people took alarm at the idea of being numbered by the government. It was feared that a kind of poll tax was about to be levied. In the counties of Limerick and Clare, the whole country was illuminated, hill and valley, with lighted firebands. In the county of Westmeath there was scarcely a head of poultry left alive, an opinion having gone abroad that a tax or rate was to be levied upon them!

Exports and Imports of Havannah.—Advices from the Havannah to the 15th of May, give a statement of the exports of produce from the 1st of January up to that date. The total amount of sugar was 223,230 boxes; coffee, 473,767½ arrobas; molasses, 27,448½ hogsheads; honey, 962 tierces; wax, 13,756½ arrobas; tafia, 2,704 pipes; sugar, 52,556½ thousands; and tobacco, 571,362½ lbs. The imports of goods from the 1st of January to the 30th of April had not been large, and the principal were 82,863¼ quintals of jerked beef; 4,329¼ quintals of tallow candles; 10,536¼ quintals of codfish; 53,990 barrels of flour; 17,012¾ quintals of lard; 5,888½ quintals of sperm and whale oil; 37,213 quintals of Spanish oil; 39,768¾ quintals of rice; 7,807¾ quintals of nails; 9,995¼ feet lumber; 1,950 pieces of Britannias; 676 pieces of canvass; 351,297 various drills; 300,960 Osnaburgs; 14,803 pieces of sheeting; and 15,765 dozen of stockings; various. The trade of the place did not appear to be brisk, and was chiefly confined to the exports. Sugars of middling and fine qualities were in good demand for shipment to the Baltic.

Jealousy of Foreign Artists at Naples.—A letter from Naples of the 28th ult. gives the following account of a murderous assault on a German engraver. "The mint being in want of an engraver to cut its dies, and no native artist of sufficient skill being known, the Directors appointed to the place M. Hiltker, a native of Darmstadt, aged 24, who had cut at Naples the dies of several medals, which were generally acknowledged to be masterpieces. M. Hiltker entered upon the duties of his new appointment on the 23d, but at 8 o'clock the same evening, as he was returning home from the mint, he was assailed in the street by two assassins, one of whom stabbed him in the side with a stiletto, and the other was making a similar attempt, when M. Hiltker diverted the stroke by raising his arm, which was wounded, and the point of the weapon entered the right eye, immediately below the globe. The wound in the side was slight, but those in the arm and eye were severe, and apprehensions are entertained that he will lose the sight of the injured organ. The assassins fled, and have not been discovered."

Curious Cause of Resemblance.—A French commanding officer who had been on the staff of the Emperor Napoleon, has recently been surprising the people at Versailles, by walking about dressed like the Emperor; his resemblance to Napoleon being so great, that many old soldiers imagined their former general had been resuscitated. The officer, whose intellects are disordered, takes pleasure in adopting the dress of renowned men, but as he created crowds in the streets he was apprehended. When taken before the Commissary, he attributed his resemblance to the Emperor to his having constantly studied and watched his features when officially in attendance upon him, and which intense observation, he says, must have operated a change in his own.

Recovery from Drowning.—An extraordinary instance of the successful adoption of prompt and scientific measures, in the ease of a person immersed in the river Avon, occurred on Saturday week, in the immediate neighbourhood of Stratford. Mr. Howlett, a dissenting minister, was bathing in the river, when he suddenly sank. A fisherman, named Thomas Vincent, about 200 yards off, by means of the boat-hook, succeeded in pulling out the body, which exhibited no symptoms of life, having been under the water for ten minutes. Mr. Frederick Pritchard, surgeon, of Stratford, was instantly sent for, and after the employment of friction, inflation of the lungs, &c., his persevering efforts for three hours were crowned with success—for respiration returned —and in eight hours from the time of submersion, Mr. Howlett was able to speak, and is now nearly recovered.

Steam-Boat Collision.—On Sunday the Orion, a large iron boat, on her way to Gravesend, with a large number of passengers, and the Greenwich, belonging to the old company, on her way to London struck against each other. As the Orion was going down, a brig was sailing up which she could not get outside of, owing to the wind being to the northward, and just after the Orion had passed, the London steam-ship, moored off Hore's whart, the Greenwich left the Tunnel-pier, 100 yards below and approached the Orion. They came stem on each other, with a terrible shock. Both steamers reversed their engines just before the collision took place, but could not stop their way. The Greenwich took the larboard bow of the Orion, carried away her cat-head, broke the chain cable, and actually went away with the Orion's anchor, which was suspended over the larboard bow. The rail of the Greenwich, which was a stout timber-built vessel, also sustained considerable damage, and her rail was carried away. The steamers afterwards proceeded on their voyages.

The Swell Mob in Railway Carriages.—The swell mob appear to have transferred their operations upon the travellers in the omnibuses to those by the railway, and the public will do well to be upon their guard against their proceedings. On Monday afternoon an elderly gentleman, named Scott, who resides at Guildford, took a place by the train of the Southampton Railway to Woking, and in the same carriage with him were three well-dressed persons, one of whom during the journey spread an open cloak upon his knees. Mr. Scott observed that this person sat very close to him, but nothing occurred to excite his suspicion, and, when the train arrived at the Kingston station, the three "gentlemen" politely wished him a good evening, and left the carriage. A few minutes afterwards he put his hand in his pocket, and found that his purse, which contained upwards of five pounds in gold and silver, had been stolen. Upon his arrival at Esher he gave information to the railway police, who instituted an inquiry and search after the "gentlemen," but without success. The police have received information of several other robberies of a similar description.

The Redbreast.—This bird has frequently been noted for the singular situations it selects for building its nest. Amongst the many instances none have been more curiously placed than one which now may be seen within a few miles of Leeds. In a cleft, in an upright post or spindle, which supports a large wheel or drum, round which the ascending and descending ropes are wound for a coal-pit, a redbreast has built its nest; there are now four eggs in it: and though the pit is in full work, and the horse which turns the upright post, with the drum above, each time the motion is reversed passes its head within a few inches of the bird—still it sits upon its nest, unmindful of the horse, or the more dangerous urchin its driver; and for hours together is turned round and back again with all imaginable composure.—*Leeds Mercury.*

Locusts in Spain.—Such immense quantities of locusts have appeared this year in Spain, that they threaten in some places entirely to destroy the crops; at Daimiel, in the province of Ciudad-Real, 300 persons are constantly employed in collecting these destructive insects, and though they

destroy 70 or 80 sacks every day, they do not appear to diminish. There is something frightful in the appearance of these locusts proceeding in divisions, some of which are a league in length and 2,000 paces in breadth. It is sufficient if these terrible columns stop half an hour on any spot, for every thing growing on it—vines, olive trees, and corn, to be entirely destroyed. After they have passed, nothing remains but the large branches, and the roots, which being underground escaped their voracity.

Highways.—It appears from a Parliamentary paper just published, that the total expenditure in money on account of the expense of maintenanee of the highways in England and Wales was, in the year ending March, 1837, £1,113,434, in the year ending March, 1838, £1,213,117, and in the year ending March, 1839, £1,267,848.

Railway and Stage Carriages, &c.—From a Parliamentary return, it appears that the total amount of the mileage and composition for duties on railway carriages and on stage carriages for the year ending the 5th of January, 1839, was in England £462,513, and in Scotland, £31,625; for the year ending the 5th of January, 1840, England, £463,435, and Scotland, £33,757; and for the year ending the 5th of January, 1841, in England, £407,960, and in Scotland, £30,060. The amount of post-horse duty paid in the year ending the 5th of January, 1841, was £237,452; in the year ending the 5th of January, 1840, £224,405; and in the year ending the 5th of January, 1839, £212,635.

Another Trial of Sir James Anderson's Steam-carriage.—On Friday evening a very interesting experiment on the power of locomotives on common roads was made wi h one of Anderson and Rogers's steam-carriages. A wagon of immense size was attached, and started from Nottingham-street, filled with persons standing in it. Both machines proceeded to town through Sackville-street, &c., and returned at a considerable speed, although surrounded at every point almost by crowds of all classes. Our informant tells us that he met it ascending the hill of Newcomen-bridge, and was struck by the extraordinary appearance of the wagon following, which was literally covered with people, and, after seeing it pass the hill, that he followed it to Nottingham-street, where he found that the number it contained was 61 or 62 grown men. Supposing them to be an average of 12 stone, we shall find that the live weight alone was about 4½ tons; and, supposing the machine to weigh only one ton, the enormous weight of 5½ tons was actually drawn up one of the heaviest hills in this neighbourhood, and run through the streets, at a speed exceeding 10 miles per hour.—*Dublin News Letter.*

Extraordinary Speed in Steam-boat Travelling.—The Ruby, which has always been a great favorite on the Gravesend station, made the passage from London-bridge wharf to the Town Pier, Gravesend, on the 7th inst., in the shortest time that has ever been known, having done the whole distance in an hour and thirty five minutes, although she stopped seven times on her passage to take in passengers.

Spontaneous Combustion.—An instance of spontaneous combustion arising from canvass soaked with oil to make it waterproof is mentioned in the *Bath Chronicle* last week. The canvass had been laid in a heap in the stable, and in the course of the night it burst into a flame, but the fire was discovered in time to prevent the destruction of the building.

The Brazil Trade.—According to some articles in the German papers the Prussian Government is carrying on very active negotiations with Brazil, and hopes to anticipate our Cabinet in the conclusion of a treaty of commerce with that empire. It is observed, however, that the Brazilian Government is by no means disposed to grant any commercial advantages to one nation in preference to others. It is proposed to concede the same privileges to all, with the reservation of resorting to reprisals against those countries which refuse to admit Brazilian produce. However, no new treaty can be entered into until the expiration of the existing treaty between Brazil and England, which continues in force until the 15th of November, 1842. Thus, according to a correspondent of the *Allgemeine Zeitung*, every thing resolves into this question:—"Will the English and the French continue to exclude Brazilian sugar and coffee, or increase their import duties? Where they so to do, which however is not very probable, then would Germany acquire a preponderating position, and a vast field would be opened for her commercial activity. Our present exports to Brazil amount only to about 6,000,000 florins, while those of England are equal to 60,000,000."

Communication of Infection by the Bite of a Fly.—The *Moniteur Parisien* relates the following story:—A young girl at Saint Gilles (Gard), while gathering mulberry leaves, was stung in the neck by a large fly which had been feeding on the putrid carcase of some animal. The wound, from being impregnated with the impure matter from the fly, immediately became inflamed, accompanied by the most excruciating pain. The wound was cauterized, and every-thing done that medical aid could devise, but without effect, and the poor girl died the following day in great agony.

Mrs. E. Seguin and Miss Bruce Wyatt had their Annual Concert on Monday, at the Hanover-square Rooms, and, notwithstanding other similar attractions at the same time, they mustered an overflowing company of admirers. The performances fulfilled to the letter their published programme, and were it in our province to dilate on the merits of musical performances, we might well fill a column with praises of the different *artistes*, vocal and instrumental, who exerted themselves to the utmost.

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THE

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AND JOURNAL OF INDUSTRY;

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THE COMBUSTION OF COAL.

In our remarks last week on the combustion of coal, founded on Mr. Williams's publication, we directed our attention chiefly to the consumption of the gaseous products distilled from coal in burning; we now propose to consider the phenomena which attend the combustion of the solid carbon, of which the great mass of the fuel is composed.

It is a curious fact, that the heat usually derived from coke in furnaces, after the bituminous matter has been extracted from the coal, is equal, if not superior, to the quantity of heat derived from the coal itself when the bitumen, which is usually considered the most combustible portion, is also ignited. This fact was stated by Dr. Fyfe, in a paper lately read before the Society of Arts for Scotland, an abstract of which was inserted in former numbers of our Journal,* and the cause of the phenomenon was in that paper satisfactorily explained. Mr. Williams, also, takes the same view of the subject, but not satisfied with ascertaining the fact and developing its cause, he proceeds to show how this great waste of heat may be prevented. That there must be great waste of heat during the combustion of coal in ordinary furnaces is evident from the fact, that the gas and tar, when extracted from the coal and burned under other circumstances, afford a large supply of heat; though when consumed, or rather partially consumed, in the furnace, there is no advantage gained.

The cause of the paradox, that no more heating power is obtained when the most combustible portions of the coal are employed, than when they have been previously extracted, may be easily explained. The carburetted hydrogen exists in the coal in a solid form, and it must be rendered gaseous before it becomes combustible. Now it is well known that all bodies when converted from a solid into a liquid, and from a liquid into a vapor or gas, absorb during the change large quantities of heat in a latent state, the attainment of which heat is a necessary condition of their assuming and maintaining the form of gas or vapour. The carburetted hydrogen in coal must, consequently, absorb heat before it can be converted into gas. The caloric of gassification, as it has been termed, is necessarily abstracted from the burning coals, and the gassification produces thereby a cooling effect similar to the vaporisation of water when thrown on a fire. It will be readily understood, therefore, that the first effect of throwing fresh coals on a fire is, to abstract the heat by the transmutation of the solid hydrogen and carbon into gas, and also, in steam furnaces, to check the generation of steam mechanically, by interposing a solid opaque substance between the fire and the boiler, and thus preventing the radiation of heat.

We learn from this consideration of the process of combustion the cause of fires being frequently extinguished by throwing on coals, even when perfectly dry. The heat is abstracted from the small quantity of burning coals by the generation of gas, formed at a temperature too low for ignition, and the heat is thus carried away without any being rendered in return. Unless, therefore, the gas distilled from coal when it is thrown on the fire is effectually burned, there must be a loss of heat arising from the employment of coal instead of coke, and the more bitumen the coal contains the greater will be the loss. If, however, the gas be properly burned, by supplying it with a proper quantity of oxygen when at a sufficiently high temperature, as explained in our article last week, the bituminous property will become a source of additional heat. It is not, as Dr. Fyfe appears to infer, that the heat required to gassify the carburetted hydrogen in coal is equal to the heat again given out on combustion, but that the combustion of the gas in furnaces is generally imperfect, and the heat is wasted and carried away up the chimney.

Though it is essential to the proper combustion of coal that the fire should be supplied with as much oxygen as will saturate the combustible matter, both gaseous and solid, yet the quantity of air admitted into the furnace should not be too great; otherwise there will be a hurtful refrigerating effect produced by the expansion of more air than is required to enter into chemical combination with the fuel. The blast of a furnace must be regulated according to the quantity of ignited fuel on the grate; for if the supply of air were disproportionately great, it would blow the fire out, just in the same manner that the flame of a candle is extinguished by blowing it too strongly.

The formation of carbonic oxide during combustion has hitherto been overlooked by engineers, though it constitutes an important feature in the process, and produces important effects, which are pointed out very forcibly by Mr. Williams.

Carbonic *acid* represents carbon when saturated with its full quantity of oxygen; it is the perfect product of the combustion of that element. Carbonic *oxide* contains only half the quantity of oxygen that is contained in carbonic acid, yet it is the same in bulk; or, in other words, one atom of carbon when chemically united with one atom of oxygen, to form carbonic oxide, occupies the same space as when it is united with two to form carbonic acid. And again, the addition of one atom of carbon to carbonic acid doubles the volume of the resulting compound. Now it is one of the properties of carbonic acid that in passing through red-hot fuel it attracts another atom of carbon, and becomes converted into carbonic *oxide*. This change has therefore a prejudicial effect on the heat-producing power of the furnace in two ways;—by the cooling influence of the expansion, and by carrying away a portion of the carbon unconsumed.

Carbonic oxide being thus combined with one atom of oxygen less than its saturating quantity, becomes a combustible instead of the product of combustion; and if it pass away unconsumed, there is so much available heating power wasted. In Mr. Williams's plan for furnaces, he renders this consumable gas available by supplying it with jets of fresh air as it passes along the flue; and by this means the requisite supply of oxygen is provided for the combustion of this inflammable gas at the place where its heat is useful, instead of allowing it to burn to waste at the top of the chimney, as is commonly the case.

The great object to be attained in the combustion of coal is, to afford a proper supply of air to the fuel, blended intimately with the burning materials, so that the elements between which the rapid chemical action takes place, may be presented within the sphere of their mutual attractions, and in quantities sufficient to produce complete saturisation. If the supply of oxygen be insufficient, or not properly applied, the combustible matter will pass away unconsumed; and if the air be admitted in quantities larger than requisite, the expansion of the superfluous quantity in passing through the incandescent fuel, will produce a direct diminution of the heat of the furnace.

* Inventors' Advocate, Nos. 91 and 92.

THE IRON MANUFACTURES OF FRANCE.

(Continued from last week.)

The article we inserted last week, on the Iron Manufactures of France, was limited to the iron works in the department of the Haut Saone: we now proceed to describe the state of the manufacture in another of the departments of France, in which iron constitutes a principal branch of the manufactures.

"The manufacture of iron, the introduction of which into the department of Doubs is anterior to the fourteenth century, has continued to increase since that period, owing to its excellent quality. There are two circumstances which appear to have had considerable influence in this increase—the introduction of the manufacture of iron wire on an extensive scale during the seventeenth century, and now recently the custom-house regulations of 1822, which extended this progressive improvement to all the forges in the kingdom. During the years immediately succeeding 1822 four blast furnaces were constructed, or brought into operation, after having remained at rest for a length of time; four new forges were established, and many old manufactories were entirely rebuilt. Yet this progress made in metallurgic industry through the whole extent of the province, was soon attended with circumstances as unfortunate as they were unexpected to the manufactory of Doubs and to others in the immediate neighbourhood.

"The manufacture of iron wire, a branch of trade hitherto confined to this district of forges, and the monopoly of which appeared necessarily connected with the excellent quality of the iron, began at this time to extend to the adjacent forges in tho departments of Nord, Est, Champagne, of Burgoyne, &c.; and the increase of their produce obliged them to seek for new markets for disposing of it. Numerous experiments made in these forges demonstrated the possibility of substituting for many purposes iron of an inferior quality, which was less expensive. Hence arose a considerable diminution in the price of manufactured produce, and especially in iron wire, which had hitherto formed one of the principal manufactures of the forges of the department. From this time there was a considerable depression in the iron manufactures of Doubs; which was felt the more sensibly as the price of the raw materials, and especially the price of wood, had been considerably raised during the time of success.

"In these unfortunate circumstances, there remained but one alternative for the ironmasters of Doubs to adopt, which was to endeavor to introduce improvements, and to reduce the price of their manufactured articles, notwithstanding the increase of price in the raw materials. This plan has been adopted for the last fifteen years, and during the last three years it has beeu particularly attended to.

"It was in or about the year 1824 that compressing cylinders were substituted for hammers for flattening out the irou.

"The application of the superfluous heat of the refinery surfaces for the various heatings required in the iron manufacture, was attempted for the first timo at Chenery in 1816. It became general in the department from 1833 to 1836.

"Other attempts which have been equally successful were undertaken with the object of employing the superfluous heat of iron works for heating the air, or for producing the moving power necessary for the blast. In this manner the superfluous flame of the blast furnace at Clerval is used for generating steam. The hot-blast is usually employed for the fusion of ore in the manufactories of Roche, Moncley, Grace-Dieu, Montagney, Clerval, Ardincourt, and Ponte do Roide. It is also used in the refining of cast-iron in the forges of Lods, Vuillafons, Quingey, Roche, Moncley, Pont-les-Moulins, Audincourt, aud Bourgurgnon. In almost all these manufactories the apparatus for the heated air consists of a series of parallel tubes connected by semi-circular divisions, the joinings of which are outside the case, against which the burning gas is impelled. The heated air is also carried through a uumber of tubes, the sizo and number of which are determined by tho requisite degree of temperature.

"It was in 1836 that wood was first used in the blast furnaces of Montagney, and at the same time an attempt was made in this manufactory to refine cast iron, by using torrefied wood. The manufactories of Roche, Moncley, and Grace-Dieu were not long in following this example; and towards the end of 1838 it was a practice regularly adopted in these works. The quantity of wood in the natural state employed for the fusion of ores amounted to two thirds of the total volume of the charge in the furnace. The form of the furnaces has not been changed; all the alteration considered requisite was to be particular in selecting woods of the hardest quality.

"In 1839 the blast furnace of Audincourt advanced a step further in the new method; it gradually added to the proportion of green wood, till it was at length used as the only fuel.

"The air was brought to 400 degrees centigrade, and the heat of the hot blast has continued thus for four months. It was however found necessary to do away with the hot blast, in order to preserve that particular quality of the iron adapted to the formation of the different articles previously made in that manufactory.

"The use of torrefied wood iu conjunction with the hot blast has produced the same fortunate results in the forges of Doubs, as was stated to be the case in the department of the Haut Saone. The iron works of Moncley have been supplied entirely with torrefied wood. In the four manufactories of Quingey, Roche, Montagney, and Pont-les-Moulins, the wood has been mixed with charcoal in various proportions, as high as two fifths of the total volume. The iron when shingled was heated again with coal, to be drawn by the grooved cylinders in one operation into rods fit to be drawn into wire.

"These various improvements have been attended with singularly economical results in the works that have adopted them. It is to be regretted that these works are restricted from more extensive adoption of these improvements, by the opiuion, and perhaps by the prejudices of many consumers, who are apprehensive that the new methods may have a deteriorating effect on the quality of the iron.

"Under such circumstances, it can scarcely be expected that new manufactories will be erected in this department. The important manufactory of Gouille was notwithstanding erected in 1815. Since this time a refining charcoal furnace has been erected at Saint Hippolyte on the Doubs, and in 1837 the fusion of steel was introduced in the mauufactory of Valentigney, with a very remarkable saving of fuel."

IMPROVEMENTS IN THE MANUFACTURE OF SUGAR.

The following account of the practical results of the introduction of a new process in the manufacture of sugar is translated from the *Journal du Havre*. The manufacturers of the apparatus which was represented to have proved so successful are engineers at Paris.

"It will soon be four years (August 1837) since M. Vincent, nephew of the late M. Fréou, a rich planter of the Isle of Bourbon, went to France and was taken to the manufactory of Messrs. C. Derosne and Cail, of Paris, who paid much attention to the improvement of the manufacturo of sugars. He learnt from them the improvements that were beginning to be adopted partially in the manufacture of beet-root sugar.

"Conducted by them to the manufactory, which at that time was the only one in the department du Nord which made use of their new apparatus and methods, M. Vincent spent a whole day there; after all the operations that he witnessed were successively explained to him, he immediately turned them to advantage, and was convinced that there was nothing in the new process that could not be applied to the manufacture of sugar from the cane, on his own estate in the Isle of Bourbon, with the greatest success.

"In this conviction he immediately formed the resolution of introducing the new method in one of his sugar-houses at Saint-Marie, at Bourbon.

"Without being alarmed at the large amount of capital necessary to undertake this enterprise, M. Vincent, impatient to return to Bourbon, entrusted the house of Quesnil Brothers and Co., of Havre, with full power to sign in his name the draught of an agreement with Messrs. C. Derosne and Cail, of Paris, to the effect that the latter should supply him with the apparatus and machines necessary to work his crop of canes in 1838, and also to provide him with the requisite materials for carrying on the new process and bringing it into operation.

"The intentions of M. Vincent were accomplished to his entire satisfaction, and on the 1st of October, 1838, he commenced his manufacture to the great astonishment of the whole colony of Bourbon.

"Since the establishment of this apparatus nothing has occurred to stop its progress; there has been no accident, and he has in this manner manufactured the produce of three successive crops which have gradually increased.

	KILS. OF SUGAR.
In 1838-1839 he manufactured......	550,000
1839-1840	900,000
1840-1841 upwards of	1,000,000

"The advantages M.Vincent derives from the use of this new process are so great, that he has succeeded in inducing the proprietors of the small sugar plantations in the neighbourhood to discontinue their manufacture and to give up their canes to him, offering for them a higher price than they would have been able to obtain by workiug the canes according to the old process.

"The results obtained are a substantial gain, for not only can considerable quantities more of sugar be manufactured, but there is obtained from a given quantity of juice a produce so abundant as to exceed from 30 to 40 per cent. that obtained on an average by the former method.

"The quality of the raw sugars obtained is infinitely superior to any before known. These same raw sugars clarified form raw white sugars, and not clayed sugars, and in whiteness and purity they will bear a comparisou with refined sugars of good quality, and may be substituted for them.

"Further, nothing is a better proof of the advantages that M. Vincent obtains by the new process, than the determination he has formed of coming to France to order apparatus and engines necessary for the establishment of an immense sugar manufactory capable of manufacturing aunually at least 2,000,000 of kilogrammes of sugar.

"The *Globe*, a vessel which left Havre on the 17th ult., conveys to M. Vincent, at Bourbon, every thing that is requisite to put this great manufactory in operation, and to enable him to manufacture the crop of 1841 and 1842. Thus Bourbon will this year be in possession of two establishments capable of producing 3,000,000 of kilogrammes of sugar annually. These are indisputably the largest sugar manufactories that have ever been established in any colony.

"The success attained by M.Vincent at Bourbon, and by the numerous manufacturers of beet-root sugar, who make use of the apparatus and process of Messrs. Derosne and Cail, has already been made known in foreign colonies. The King of Holland, since the statements sent to him of the result of this new manufacture, expressed a wish

that it should be introduced at Java, a colony in whose prosperity he has always been greatly interested. He has given orders for the establishment of four manufactories at Java, each capable of producing a million kilogrammes of sugar.

"A large establishment formed at the Havannah by M. de Arietta, commenced its operations more than a month ago. The apparatus and machinery necessary for constructing a sugar manufactory not far from San Bles, are going to be sent to a rich proprietor at Mexico, the Marquis of Castagnos. Negotiations are in progress to form large establishments at Bengal, at Surinam, Demerara, &c. In a word the movement is given, and every thing induces us to believe that a few years hence, the revolution in this kind of manufacture, which has so long been stationary, will become general."

ON THE METAL-CLEANSING PROPERTY OF A DOUBLE CHLORIDE OF ZINC AND ANTIMONY.

BY M. GOLFIER BESSEYRE.

There is a double chloride formed of joint equivalents of chloride of zinc and sal-ammoniac, easily crystallised, sometimes in plates and sometimes in prisms, according to the dilution or acidity of the medium, but always forming rectangular parallelograms, the solid angles of which are often truncated, so as to present hexagons very often of the diamond form, susceptible of increasing in every direction, and forming either hexahedral prisms or hopper shaped forms, &c.—in short, it has a great tendency to crystallisation. It is very soluble; water takes up more than one and a half times its own weight at common temperatures, and three and a half times at a boiling heat. The solution is very rapid, producing great depression of temperature.

Heat decomposes it into hydro-chlorate of ammonia, which sublimes, and chloride of zinc, which dissolves. The most remarkable property of this compound is the facility it affords in tinning or coating metals. It is easy, by means of this salt, to cover copper or iron with tin, lead, or zinc; zinc with tin or lead; and even tin with lead, and the reverse. It appears to cleanse so well the metallic surfaces to which it is applied, that the metals form, immediately on contact, the alloy on which metallic coating depends; at least it is thus that I explain this singular experiment—of coating a plate of tin by means of a plate of lead, and reciprocally a plate of the same lead with a plate of the same tin.

The advantages derivable from this are very great; the cheapness with which this substance may be procured allows of its common use. Some of the applications I have already made are—coating a sheet-iron kettle with lead simply, which has been in use about two months, for the crystallisation of fluids which contain an excess of sulphuric acid, without any alteration being discoverable; all the instruments employed with this kettle, whether of copper or of iron, were coated also by means of lead.

From motives of economy, I had several large vessels made of zinc, as well as covers of tubs and boilers, but very soon the united action of air and steam, of heating and cooling, deteriorated the vessels, and oxide of zinc came off from them in very thick plates. To have made them of tinned iron would not have comported with my views of economy, and, besides, commerce furnishes the material only in small sheets. I coated with tin the surfaces exposed to the injury, and I am at present well satisfied with the effect. This double chloride, I conceive, acts as a reducing substance; for I had a large sheet iron stove in the laboratory so much corroded by oxidation, that in many places it had holes in it; I coated it with lead, and it has become like a new stove. It is the solution of this substance particularly that must be employed, for it is essential that the surfaces to be coated should be moistened so that the little cavities which oxidation has made may be exposed to its action. I mention this because several persons appear to adhere to the use of it in powder.

If we borax a piece with water holding borax in solution and suspension, its preservative action commences at the boiling temperature, for the water leaves borax over the whole surface of the piece to be soldered; but if we use it in powder, success is much more uncertain, for the powder first calcines, then melts into small drops, which leave intervals exposed to the oxidating action of hot air, and it is only at the temperature of bright redness that it spreads over the surface so as to facilitate the combination of the solder with a metal.—*Ann. de Chimie.*

EXPERIMENT ON THE ATMOSPHERIC RAILWAY.

(From the Railway Times.)

On Wednesday last a large party of distinguished and scientific persons assembled at Wormwood Scrubs, to witness a further series of experiments on the Atmospheric Railway of Messrs. Clegg and Samuda. Among those present we observed Right Hon. Lord Morpeth, Sir Henry Parnell, the Hon. Mr. Ponsonby, Sir James South, the Hon. W. Sturges Bourne, Mr. W. Tooke; Mr. James Pim, Treasurer of the Dublin and Kingstown Railway; Mr. Baxendale, Chairman of the London and South-Eastern Railway; Mr. Johnson, of the Forth and Clyde Canal; Mr. M'Mullen, of the Irish Grand Canal; Mr. Barrington, Solicitor to the Irish railways; Mr. M'Neill, C.E.; Mr. Vignoles, C.E., besides other gentlemen connected with railway interests or general science. The interest taken in the day's proceedings by Lord Morpeth and many of the above-mentioned gentlemen arose from the probability that this invention will be put to proof on the tramway from Kingstown to the village of Dalkey, with a view to its adoption on an extended scale in the projected Irish railways. One of the lines of this tramway is at present unused, and affords, therefore, a convenient opportunity of testing the merits of the system, under the immediate eye of the Irish Government.

The plan itself is too well known to need more than a very slight description here. Midway between the rails of an ordinary railway lies secure to the sleepers a continuous pipe of suitable diameter; let a piston attached to a carriage for passengers run in this pipe, and a stationary steam-engine exhaust the pipe before it. It is clear that if the parts of the machinery are sufficiently perfect, the atmospheric pressure on the back of the piston will move the carriage and its load with a velocity resulting from the proportion between that pressure and the resistance to be overcome. So far the theory is an indisputable one of naked science; the rest of the mechanical investigation lies in this question:—Are the parts of the machinery sufficiently perfect to produce with certainty the theoretical effect? We will first describe the road and machinery we saw, and then state the experiments which were designed to answer this question.

The rails and pipe (of half a mile in length) are laid on an embankment belonging to the West London Railway Company, and having an incline of 1 in 115. The rails themselves are old ones discarded from the Liverpool and Manchester Railway, and in their present state on the ground present a kind of zig-zag caricature of a railway; certainly no locomotive engine would venture over them. Not only have they sharp deep hollows in many places, but if we are not mistaken, the inclination of the carriage in passing over them changes continually from side to side.

The pipe, which is a cylinder of 9 inches internal diameter, is as irregular as the rails, but its irregularities do not by any means correspond to theirs. We mention this for the sake of the proof it affords that, contrary to what might have been expected, much less than ordinary accuracy of workmanship seems to provide sufficiently for the necessary action of the parts. The pipe has been laid down about 14 months, and has received no repair during that time; it has consequently undergone changes of temperature as great as any to which such pipes are likely to be subject, without injury to its effectiveness.

The air pump is of $37\frac{1}{2}$ inches diameter, and is worked by a steam-engine in very inferior condition, said to be of 16 horses power.

Throughout the entire length of the pipe there is of necessity a slit in its crown to afford the needful connection between the piston and the carriage: it appeared to us that it was most important to ascertain whether the means adopted to make and keep this opening air-tight after the passage of each train were found to be effectual. Between, therefore, the third and fourth trials hereafter described, and therefore after this slit had been opened and closed three times, we observed that the air pump, in making 16 2-feet strokes per minute, slowly improved the exhaustion, it being at the beginning 16, and at the end 17 inches of mercury. The effect of the air pump therefore balanced, and a little more, the total leakage into the pipe, of which that from the flexible valve which covers the slit is part.* We were informed that the engine and pump now in use exhaust the half mile of pipe to 18 inches of mercury in $1\frac{1}{4}$ minutes, and that the pipe refills from leakage in 8 minutes. This takes place at the present time, that is, after the pipes have undergone whatever changes could be effected by the variations of temperature in 14 months, and the settlement of a new embankment.

In each of the following trials the carriage went down the incline by its gravity alone, and was propelled up it by atmospheric pressure. The distance by which the speed was ascertained is situated a little beyond the middle of the half mile, reckoning from the end at which the carriage starts, and is one-seventh of a mile in length; the time of passing this distance was accurately taken with a seconds watch.

	Time of passing over one seventh of a mile. Seconds.		Speed in miles per hour.
First trial carriage nearly filled with persons	27	..	19·05
Second ditto, carriage loaded as before	25	..	20·6
Third ditto, lightly loaded	20	..	25·7
Fourth ditto	22	..	23·4

Our belief at the time was, that in consequence of the wretched state of the rails the carriage did not acquire its uniform velocity until after it had passed the measured space, and perhaps not at all during its trip.

During the last experiment the mercurial gauge showed an exhaustion of 18 inches, which was steadily maintained during the transit of the carriage by the engine working 25 strokes per minute. It was probably similar to this during the other trials. It will be observed that the performances improved during the experiments, as we understand they usually do.†

It seems to us to follow from these facts that by the invention of Messrs. Clegg and Samuda atmospheric pressure is rendered available for the propulsion of railway carriages through machinery of a cheap, common, and even coarse construction; that the weight of the locomotive engines being dispensed with (often half that of the entire profitable train which it draws), lighter rails and less costly roads may be used, as well as that greater *profitable* weight may be propelled by the same power; and that whatever saving results from the substitution of stationary for locomotive power may be obtained.

* We should not omit to state, that for the particular satisfaction of Lord Morpeth, a leak was sought for, but in vain; an attempt was then made to remove some cement from the joint so as to make one for the sake of showing that its peculiar whistle would always give notice of its existence; but it was not found practicable to produce a leak in this way, the cement having insinuated itself between surfaces held fast together by the atmospheric pressure.

† It is scarcely necessary to remark that the velocity is not limited to that actually attained in these experiments; we see it stated that 40 miles per hour have been reached with this apparatus; but all this depends on the size of the engine and pipes relatively to the load and resistance.

It follows also from the peculiar mode of working rendered necessary by the construction of such a railway, that no collision of trains could take place.

ALLEGED INFRINGEMENT OF A PATENT.

The Court of Common Pleas was occupied on Saturday, Monday, and Tuesday, in hearing the case of Gibson and Campbell against Brand, for an alleged infringement of their patent for spinning silk. Sir F. Pollock, Mr. Serjeant Bompas, Mr. M. W. Hill, Mr. Hoggins, and Mr. Gale, appeared for the plaintiffs, and Sir W. Follett (with whom were Mr. Kelly, Mr. Serjeant Channell, and Mr. Henderson) for the defendant. The trial lasted till a quarter to 8 on Tuesday evening, when the jury retired to consider their verdict. The substantial questions at issue may be stated in a very few words. The plaintiffs, Messrs. Gibson and Campbell, took out a patent, dated the 19th of November, 1836, for a new and improved process of spinning silk in the long fibre, from waste silk, for which purpose they employed the old flax-spinning machine or "throssel," with certain alleged improvements, consisting chiefly in the use of brass bosses or rollers, the reduction of the distance between the rollers and the spindles, and the dipping of the pressing roller in a trough of water; the application of the water taking place at the "nip"—viz., just where the drawing ceased and the spinning began. The length of the ratch, rack, or reach was also fixed at from 11 to 15 inches. The plaintiffs, admitting that the several parts of the machine were not new individually, laid claim to novelty in their combination and use, and witnesses were called on their behalf, who stated that they had never heard of the spinning of silk in the long fibre from waste silk until the plaintiffs took out their patent. On the other hand, a large number of witnesses of great respectability were examined for the defence, who deposed that silk was spun in the long fibre from silk waste long before the date of the plaintiff's patent, and that their machine was neither new in its parts nor in their combination. Among other witnesses Mr. Pattison (late M.P. for the city of London) stated, that as far back as the year 1816 the same kind of fabric as that manufactured by the plaintiffs was produced at his mills at Congleton, and was sold by him to different houses in Coventry, Nottingham, London, and other places. The silk thus manufactured was spun from the flax spinning machine then in use, differing, as was stated, in no respect from the model of the plaintiffs' machine, except in the distance between the rollers and the spindles, which frequently varied even in the "throssels." Other witnesses spoke to the use of brass bosses in the "throssel" many years ago; and the application of water at the "nip" was sworn to have been known for the last 40 years, and also to be in constant use.

The Lord Chief Justice having summed up the evidence, the jury retired to consider their verdict at a quarter to 8 o'clock. At 10 o'clock they returned into court, and stated their opinion that the invention was not new, but that the process was improved, amounting to a verdict for the defendant.

BRITISH PATENTS.

MONTHLY LIST OF NEW PATENTS.

George Bent Ollivant and Adam Howard, of Manchester, millwrights, for *certain improvements in cylindrical printing machinery for printing calicoes and other fabrics, and in the apparatus connected therewith, which is also applicable to other useful purposes.*—6 months, June 5.

John Mee, of Leicester, framesmith, for *improvements in the manufacture of looped fabrics.*—6 months, June 5.

William Hannis Taylor, of Lambeth, Esq., for *certain improvements in propelling machinery.*—6 months, June 5.

Joseph Gibbs, of the Oval, Kennington, civil engineer, for *certain improvements in roads and railways, and in the means of propelling carriages thereon.*—6 months, June 5.

Miles Berry, of Chancery-lane, patent agent, for *certain improvements in machinery or apparatus for ruling paper.*—6 months, being a communication, June 5.

James Colley March, of Barnstaple, Devon, surgeon, for *certain improved means of producing heat from the combustion of certain kinds of fuel.*—6 months, June 8.

Henry Richardson Fanshaw, the younger, of Hatfield-street, Christ-church, chemist, for *improvements in curing hides and skins, and in tanning, washing, and cleaning hides, skins, and other matters.*—6 months, June 10.

John George Bodmer, of Manchester, engineer, for *certain improvements in machinery for propelling vessels on water, parts of which improvements apply also to steam-engines to be employed on land.*—6 months, June 10.

Edward Hammond Bentall, of Heybridge, Essex, iron-founder, for *certain improvements in ploughs.*—6 months, June 10.

Robert Oram, of Salford, engineer, for *certain improvements in hydraulic presses.*—6 months, June 12.

James Wills Wayte, of the Morning Advertiser Office, Fleet-street, engineer, for *certain improvements in machinery or apparatus for letter-press printing.*—6 months, June 12.

John Anthony Tielens, of Fenchurch-street, merchant, for *improvements in machinery and apparatus for knitting.*—6 months, being a communication, June 12.

George Claudius Ash, of Broad-street, Golden-square, dentist, for *improvements in apparatus for fastening candles in candlesticks.*—6 months, June 12.

Edward Palmer, of Newgate-street, gent., for *improvements in producing printing surfaces, and in the printing china, pottery ware, music, maps, and portraits.*—6 months, June 12.

Ezekiel Jones, of Stockport, mechanic, for *certain improvements in machinery for preparing, slubbing, roving, spinning, and doubling cotton, silk, wool, worsted, flax, and other fibrous substances.*—6 months, June 12.

Alexander Horatio Simpson, of New Palace-yard, Westminster, gent., Peter Hunter Irvin, and Thomas Eugene Irvin, both of Charles-street, Hatton-garden, philosophical instrument makers, for *an improved mode of producing light, and of manufacturing apparatus for the diffusion of light.*—6 months, June 17.

Thomas Walker, of North Shields, engineer, for *improvements in steam-engines.*—6 months, June 18.

William Petrie, of Croydon, gent., for *improvements in obtaining mechanical power, which are also applicable for obtaining rapid motion.*—6 months, June 19.

John Haughton, of Liverpool, clerk, master of arts, for *improvements in the method of affixing certain labels.*—6 months, June 19.

James Henry Shaw, of Charlotte-street, Blackfriars, jeweller, for *improvements in setting wheat and other seeds.*—6 months, June 19.

Sir Samuel Brown, Knight, of Netherbyers House, Berwick, for *improvements in the means of drawing or moving carriages and other machines along inclined planes, railways, and other roads, and for drawing or propelling vessels in canals, rivers, and other navigable waters.*—6 months, June 19.

John George Truscott Campbell, of Lambeth-hill, Upper Thames-street, grocer, for *improvements in propelling vessels.*—6 months, June 19.

Joseph Gauci, of North Crescent, Bedford-square, artist, and Alexander Bain, of Wigmore-street, Cavendish-square, mechanist, for *improvements in inkstands and inkholders.*—6 months, June 21.

William Walker, of Liverpool, watch finisher, for *an improvement or improvements in the manufacture of the detached lever watch.*—6 months, June 23.

Robert Stephenson, of Great George-street, Westminster, engineer, for *certain improvements in the arrangement and combination of the parts of steam-engines of the sort commonly called locomotive engines.*—6 months, June 23.

John Godwin, of Cumberland-street, Hackney-road, pianoforte-maker, for *an improved construction of pianofortes of certain descriptions.*—2 months, June 23.

James Sidebottom, of Glossop, Derby, manufacturer, for *certain improvements in machinery, or apparatus for preparing cotton and other fibrous substances for spinning.*—6 months, June 23.

William Chesterman, of Burford, gent., for *improvements in filtering liquids.*—6 months, June 23.

George Thomas Day, of Upper Belgrave-place, Pimlico, gent., for *an improved apparatus for creating draft applicable to chimneys and other purposes.*—6 months, June 23.

John Henry Le Keux, of Southampton-street, Pentonville, engraver, for *an improvement in line engraving, and in producing impressions therefrom.*—2 months, June 23.

Miles Berry, of Chancery-lane, patent agent, for *a new or improved engine, machine, or apparatus for producing or obtaining motive power by means of gases or vapours produced by combustion.*—6 months, being a communication, June 23.

John Lee Stevens, of King Edward-street, Southwark, general agent, and John King, of College-hill, in the City of London, printer, for *certain improvements in candlesticks and other candleholders.*—6 months, June 25.

PATENTS NOT SPECIFIED LAST WEEK, WHEN DUE.

George Wildes, of the City of London, merchant, for *improvements in the manufacture of white lead* (being a communication), due June 16.

John Steward, Esq., of Wolverhampton, for *an improvement in the construction of pianofortes, harpsichords, and other similar stringed musical instruments*, due June 16.

Hugh Graham, of Bridport-place, Hoxton, artisan, for *a new mode of preparing designs and dyeing the materials to be used in the weaving and manufacture of Kidderminster carpets, and for producing patterns thereon, in a manner not before used or applied in the process of weaving and manufacturing such carpets*, due June 16.

ENGLISH EXPIRED PATENTS.

THOMAS DON, millwright, and ANDREW SMITH, builder, both of London, for *methods of making and constructing shutters and blinds of iron or steel, or any other metals, or compositions thereof, and improved methods of constructing and fixing shutters and blinds of iron or steel, or any other metals or materials, and methods of uniting in shutters the double properties of shutters and blinds*, June 15.

SOLOMON ROBINSON, of Leeds, flax-dresser, for *improvements in machinery for hackling or dressing and clearing hemp, flax, and tow*, June 16.

LAMBERT DEXTER, Esq., of London, for *improvements in machinery for the purpose of spinning wool, cotton, and other fibrous substances*; commuuicated by a foreigner, June 16.

SPECIFICATIONS OF ENGLISH PATENTS.

ENTERED AT THE ENROLMENT OFFICE.

(*Continued from page* 390.)

CHARLES WINTERTON BAYLISS, of Birmingham, accompting-house clerk, for *an improved metallic pen, to be called the flexion pen, and an improved penholder*, June 16.

The improvement in pens consists in bending the nib of the pen upwards, by which means the angle formed by the slit of the pen and the surface written upon will be more acute than the angle formed by the slit of the ordinary metallic pen and the surface written upon, and greater elasticity and freedom will be obtained.

The improvement in penholders eonsists in bending the end of the penholder upwards, by which contrivance the angle formed by the slit of the pen and the surface written upon is rendered more acute than by the ordinary mode of using pens, and is productive of greater elasticity and freedom.

Claim.—The improvements in metallic pens, and penholders, above described.

CHARLES BOTTEN, of Farringdon-street, London, gas engineer, for *a certain improvement in gas-meters*, June 16.—The object of this improvement is to keep the water in the gas-meter at its proper level.

In the ordinary square frame in front of the gas-meter a pipe is placed, the upper end of which is at the proper level for the water, and at the lower end is an orifice, which opens into a close chamber at one end of the square frame; this chamber is provided with a waste pipe for the egress of the superfluous water, the upper end of which is at the same level as the upper end of the other pipe, the lower end extends below the meter, and may be closed by a screw-plug.

The water is first poured into the body of the gas-meter through a pipe, from 'thence it flows through an opening in the centre of the meter into the square frame, and there rising to the top of the pipe runs down the same into the close chamber, where it rises to the top of the waste-pipe, and runs down the same, so that it is impossible for the water to remain in the gas-meter above its proper level.

Claim.—The improvement in gas-meters described.

JAMES MOLYNEUX, of Preston, Lancashire, for *an improved mode of dressing flax and tow*, June 16.—This invention eonsists in dressing flax and tow in a machine, similar in some respects to a silk-dressing machine.

The stricks of flax to be dressed are held by strick-boards, which are similar to those ordinarily used in silk-dressing machines, and are secured to the table in the same manner; the table is supported by a carriage (the wheels of which travel on a railway under the machine), and is capable of turning round on the same by means of a pin projecting from its centre, and entering a recess in the eentre of the carriage. The table, with the flax on it, being run under the machine, is gradually raised to the heckles or combs by means of two pairs of lever segments, connected together by rods, and worked by a chain attached to one pair, the other end of it being fastened to a conical drum, on which it is alternately wound and unwound according as the table is to be raised or lowered. The heckles or combs are attached to a revolving endless band, passing over two rollers at each end of the machine, and are freed from the flax which collects on them by means of brushes fastened to a revolving endless band, and the brushes are in turn cleared by a stripper or doffer-wheel.

As soon as the flax has been sufficiently combed, the table is allowed to descend, which is effected by the action of what the patentee calls a stopping bob-weighted lever apparatus. The table while ascending acts upon one end of a trigger-lever, and causes the other end of it to pass away from the light end of a bob-weighted lever, which then rises, and causes a small forked lever to come in contact with a creeper bar, and raise the lower end of the same out of the teeth of a ratchet-wheel, connected by wheels and pinions with a wheel on the shaft of the eonical drum above named, which, on the ratchet-wheel being set free, is allowed to revolve, and give off the chain, but is prevented from so doing at that moment by reason of the ratchet-wheel being held by a click, which is raised by the operator when the flax has been sufficiently combed, and then the weight of the table causes the cbain to unwind from the eonical drum, and allow the lever segments to fall back gradually, and thereby lower the table. The upper end of the creeper-bar is attached to an eccentric, which being made to revolve, causes the creeper-bar to turn the ratchet-wheel round a few teeth each revolution, and so by means of the wheels and pinions above named to wind the chain upon the conical drum, and thus raise the table, the ratchet-wheel being prevented from running back during the operation, by the click.

Claim.—The mode of dressing flax and tow in a machine, similar to a silk-dressing machine, having the clearing and doffing apparatus and the stopping bob-weighted lever apparatus described.

JAMES DAVIS, of Shoreditch, Middlesex, engineer, for *an improved mode of applying heat to certain steam-boilers*, June 16.—This invention consists in placing a eoke-oven or ovens within the fire-tube of such steam-boilers as will admit of the same, in order that the flame and heat generated within the said ovens may pass off through apertures in the crown or arch of the same to the inner surface of the fire-tube, and thereby heat the liquid contained in the boiler.

When one oven is placed in the fire-tube, the flame and heat produced within it passes out through an opening in the arch of the oven into the fire-tube. When two ovens are made use of they are placed one above the other, and the flame and heat from the lower oven passes out through lateral openings made in the upper part of it, into the space between the outside of the upper oven and the inner surface of the fire-tube; the flame and heat from the upper one passes out through an opening in the arch of the same into the fire-tube.

Under the coke-oven (or under the lower oven when two are used) a false bottom may be placed, on which a fire may be kindled, for the purpose of aiding the conversion of the fuel into coke.

Claim.—The application of heat for generating steam in steam-boilers or generators, by placing an oven or ovens, with such arrangements of flues, apertures, and false bottoms as herein mentioned, within the fire-tube of a steam-boiler or generator.

ANDREW PRUSS D'OLSZOWSKI, Esq., of No. 2, Ashley Crescent, Middlesex, for *a new and improved level for ascertaining the horizon, and the several degrees of inclination* (being a communication), June 16.

The level consists of a rectangular frame, from the upper side of which a pendulum is suspended by cylindrical pivots inserted into cylindrical apertures in the frame-work; the lower end of the pendulum is provided with an index point, which traverses before a graduated semi-circle attached to the frame, previous to graduating which the level is placed on a body known to be perfectly horizontal, and the spot to which the index points when at rest is made the zero point of the ecale.

If this level be placed on an inclined body or plane, the pendulum will maintain its perpendicular position, and point out on the semi-circle the degree of inclination from the horizontal of the body on which it is placed.

In place of a pendulum a loaded bob may be used, and the shape of the frame may be varied.

Claim.—The application of a pendulum or loaded bob to the construction of a level as described.

ELIAS ROBISON HANDCOCK, Esq., of Birmingham, for *certain improvements in mechanism applicable to turn-tables, for changing the positions of carriages upon railroads, which improvements are also applicable to castors for furniture, and other purposes*, June 18.—This invention consists, firstly, in the application of anti-friction collars to axles, whether vertical or horizontal; secondly, in an improved mode of retaining the oil which is to lubricate the same; thirdly, in arranging and supporting vertical axles or pivots, so as to sustain heavy weigbts thereon. It is shown applied to turn-tables, castors, and the axles of carriages, but is applicable to many other uses.

The following is the mode of applying this invention to turn-tables for turning carriages upon railroads:—To the underside of the table a circular flange is fastened, and from the centre of this flange a conical pivot projects, the apex of which is made of steel; this pivot works in a steel centre step on the top of the vertical bearing shaft, the lower end of which is fixed in the foundation frame of the turn-table, and fitting loosely around this shaft (within the outer cylinder which encloses the same) are two anti-friction collars made of gun metal. On the underside of the outer cylinder a "massive flange" is cast, and to it the lower ends of a series of stay-bars are bolted, the upper ends of which are bolted to the underside of the table near its periphery.

If a carriage is placed on the table, and the same turned in the usual manner, the pivot will revolve in the steel centre step, and with it the table and its stay-bars, around the vertical bearing shaft.

This invention is applied to castors in the following manner:—To the leg of the table or other article of furniture, the socket of the castor is fastened, a hole being made in the leg for the reception of a cylindrical piece containing the parts herein-after mentioned. This piece is a hollow cylinder of cast iron, closed at its upper end, and having near its lower end a flange, by which it is attached to the socket by rivetting; the interior of this cylinder is conical at top, and enlarged at bottom, on the outside of which enlarged part a thread is cut, in order that a cap may be screwed on the same. Within this cylinder is a cylindrical pin of iron, the upper end of which is capped by a cone, the diameter of whose baso exceeds that of the cylindrical part of the pin, and to the lower end the horns of the castor are fixed. The cone rests upon the upper edge of a cylindrical collar, which fits loosely around the pin; the lower end of this collar is flanged, and rests upon the cap above-named, which is screwed to the lower part of the cylinder, the said cap having an opening in its centre through which the cylindrical pin passes.

The mode of applying this invention to the axles of carriages, is as follows:—On the axle near its end a collar is welded, provided with an annular cavity for the retention of oil; against the front of this collar, and moving freely on a cylindrical step formed on the axle, is a loose cylindrical collar, and on a smaller cylindrical step formed at the end of the axle a similar collar of less diameter turns freely. At the back of the fixed collar is a turned steel collar, and against this collar a turned flange is placed. Against this flange, and entirely covering the outside of the same is a brass boss or collar fastened to the axle by screws. The axle-box is now put on the axle, having an adjustable iron plug screwed into its outer end, the conical extremity of which fits into a conical cavity in the end of the axle, the plug being kept in its place by a brass cap,

which is screwed on to the end of the axle-box, and the box is attached to the fixed collar by screws.

The oil is poured into a cylindrical hole bored transversely into the axle, and is conveyed by it into a longitudinal hole in the same, from thence it passes round the axle, and into the various crevices, in order to lubricate the same.

The following arrangement is made in order to prevent any lateral play between the axle and the box, more than is necessary for the free working of the same:—In the recess of the axle-box in which the plug is screwed, a series of notches are cut, and on the screw-plug another series of equi-distant notches are made, each series being so arranged that only one notch in each coincides at the same time, and whenever this occurs after the adjustment has been made, by screwing or unscrewing the plug, a small square piece of steel is put into the cavity formed by the coinciding notches. All motion in the screw-plug is thus effectually prevented, and the parts are kept in adjustment by screwing on the brass end cap.

Various modifications of the above are shown.

Abraham Alexander Lindo, of Liverpool-street, Finsbury-circus, London, gentleman, for *improvements to be applied to railways and carriages thereon, to prevent accidents, and to lessen the injurious effects of accidents to passengers, goods, and railway trains*, June 18.—The first part of this invention consists of a self-acting apparatus for shutting off the steam from the cylinder of the engine, and sounding the whistle.

From the under-part of the platform of the engine on which the engine-men stand two iron rods are suspended by eye-bolts, the upper ends of the rods, which are bent, being inserted into the eye-bolts, so as to allow of the lower ends of the rods vibrating to and fro, these lower ends having a horizontal rod attached to them. Near the upper ends of these rods are two thin iron plates, which serve as rests for a weight, and are hinged to the rods in such a manner as to be capable of moving upwards from their usual horizontal position into a vertical one, but at the same time are not allowed to descend lower than a horizontal position. On these plates a weight rests, which is attached by chains to the handle of the steam whistle, and the handle of the regulator, being kept in its place on the plates, and prevented from accompanying the vibrations of the rods, by two small flat vertical bars of iron (one before and the other behind it) attached to the under part of the platform, and descending to within an inch or two of the plates.

At those places on the line of railway where it is desired to cut off the steam and sound the whistle, a staff, placed either in the centre of the line of rails, or on one side of the same, is caused to assume a vertical position, and the horizontal rod above-mentioned coming in contact with the same, is caused (together with the rods to which it is attached, and which are at other times kept stationary by means of springs) to vibrate, thereby withdrawing the plates from under the weight, which then descends, and, by means of the chains, cuts off the steam and sounds the whistle. As soon as the framing of the apparatus has passed the staff, it returns to its vertical position, and remains stationary; the engine-driver then raises the weight up between the plates by means of the chains, and the plates instantly regaining their horizontal position, the weight is lowered until it again rests upon them.

The second part of this invention consists of a "pioneer," for clearing the top and under parts of the rails of obstructions that might be on or under them, close to the flanges of the wheels, and also by means of such pioneer applying the breaks; also a "life preserver," for picking up men and cattle which may be lying on the rails.

The frame of the pioneer is composed of bars of iron, and is attached at the top (in a vertical position) to the front part of the engine, in such a manner as to be capable of sliding back a short distance, on its meeting any very large or weighty obstruction on the rails, or in case of its coming in contact with a train which may be on the same line of rails. The lower part of the pioneer is provided with a pair of shares, for clearing the under parts of the rails of all obstructions which might interfere with the flanges of the wheels; the tops of the rails are cleared by brooms, also attached to the lower part of the framing. The back part of the pioneer is connected by bars or rods with the breaks of the engine, and likewise with the apparatus for shutting off the steam and sounding the whistle, so that on its coming in contact with a train on the same line of rails, it recedes a little, applies the breaks, shuts off the steam, and sounds the whistle.

The life preserver is a horizontal frame, attached to the lower part of the pioneer by a connecting-rod, running through from one side to the other; it is also attached to the frame of the pioneer by stays jointed in the middle, so as to allow of its being raised out of action when required by a chain or rope. The whole couch of the life preserver, as well as the front of the pioneer, is covered with thick and soft padding, or mattresses, which, overhanging the fore-part of the life preserver, are continued to within a short distance of the top of the rail, the overhanging portion resting on an easy spring which runs along the whole front of the same.

By this arrangement, men or cattle lying on the rails will be struck a very slight blow, and will be received on to the couch of the life preserver.

The third part of this invention consists of an apparatus which the patentee denominates a clamp and stay, attached to locomotive-engines and railway carriages to prevent their running off the rails, and to support them in case of the axles or wheels breaking.

To the under part of the locomotive-engine or carriage an upright circular shaft is attached, the lower end of which is forked, and terminates in horizontal arms extending outwards. Between the forks is a large wheel, which travels on a centre T rail, laid all along the line of railway. To the horizontal arms of the circular shaft the upright arms of two clamps are attached, which clamps consist of an upright and a horizontal arm in one piece, the horizontal arms extending inwards towards each other, and terminating in a ball and socket, which nearly touches the sides of the centre rail, and on each horizontal arm near its end is a small vertical wheel, nearly touching the under part of the centre rail.

In the event of the carriages deviating from their proper track, the small vertical wheel and ball and socket on one side of the centre rail, will be caused to bear against the side and under part of that rail, and thereby prevent the carriages from getting off the rails; and in case of the breakage of a wheel or axle, the carriage will be supported by the large wheel of the upright shaft.

Two of these are attached to the engine, and to each carriage, the foremost one of those attached to the engine having a pioneer and shield, the pioneer consisting of two shares for clearing the under part of the centre rail, and being also provided with brooms for clearing the top of the same. The shield consists of two semi-circular bars of iron, connected together by bolts, and covered with sheet iron; it is placed in front of the large wheel of the upright shaft, its upper end being fastened to the top of the forks, and its lower end terminating within three or four inches of the top of the centre rail.

The fourth part of this invention consists of a buffer carriage, to be placed before the engine, and also behind the last carriage of the train.

It consists of two rectangular cases of iron running on wheels, and furnished with springs, the greater serving as a sheath for the lesser; the interior of each case is occupied by frames of wood, on which circular mattresses filled loosely with soft elastic materials are suspended, extending from one frame to another; the frames are connected with each other by spiral springs, four between every two frames. The back end of the large case, and the front end of the small case, are both closed, forming the ends of the buffer carriages, but the other ends are open. To the back end of the large case, one end of a hollow iron tube is attached, and the other end of the tube, after passing through holes in the mattresses of that case, it attached to the first wooden frame in the smaller case. To the front end of the smaller case, one end of an iron rod is attached, the other end after passing through the mattresses of that case entering and being supported by the iron tube. At the bottom of both cases are vents for allowing the air to escape out of them when they are pressed together by collisions, and the outer ends of both cases are well padded with soft elastic materials.

On a collision occurring between two trains, the cases will be pressed together, and will lessen the concussion, the larger case being pressed by the engine before which it is placed, and the smaller one by the other train.

Modifications of the above are shown, in one of which the smaller case contains a cylinder partly filled with water, on which a piston connected with the larger case acts.

The last part of this invention consists of an improvement in the means of transmitting signals on railways.

All along the line of railway, at distances of about a mile apart, station-houses are placed, which are open in front, but closed at the back and sides, having a door in the back opening into a space behind the house, in which a pillar is placed. In each side of the house is an opening, directly opposite each other, and suspended from the roof parallel to these openings is a Chinese gong; the openings are closed by flaps, the interiors of which are convex, and the exteriors plane, and to whichever direction it is desired to conduct the sound of the gong, the flap on that side is raised, and the other one lowered, so as to close the opening on that side of the station-house.

On the top of the pillar above named is a lamp, the front and sides of which are provided with panes of white glass; to the bottom of it three panes of green glass are hinged, which can be raised up outside of the white panes, and to the top of it three panes of red glass are hinged, which can be lowered outside of the white panes; the top of the lamp is likewise provided with three opaque tin sheets, which can be lowered over the panes of glass, when it is desired to throw the light in one direction only.

ENTERED AT THE ROLLS' CHAPEL OFFICE.

(*Continued from page 373.*)

William Tudor Mabley, of Wellington-street North, in the parish of St. Paul, Covent-garden, Middlesex, mechanical draftsman, for *certain improvements in producing surfaces to be used for printing, embossing, or impressing*, June 17.—These improvements consist in certain modifications or applications of the art known as electrography, or electro-metallurgy.

Claim first.—The production of a surface suitable for printing, embossing, or impressing one perfect or connected design, by joining together moulds of a portion or portions of the design, and then precipitating metal upon them through the agency of voltaic electricity. The patentee also claims separately, under this head, the mode described of obtaining flanges to the precipitated moulds.

A portion, say one-fourth, of the whole design is engraved, and a mould is obtained of that portion, which mould, if it is not a conducting substance, must be made one; but the moulds preferred are those which are themselves made by the agency of voltaic electricity, to do which, such parts of the engraved portion of the design on which it is desired that the metal should not be precipitated are varnished or otherwise insulated, and that portion is then placed in a vessel containing a solution of a metallic salt, and brought into communication with the positive pole of a voltaic battery. When the metal is deposited to a sufficient thickness,

the patentee removes the same, and the process is continued until the required number of copies is obtained, which in this case is four; these four copies (which are in relief) are then filed or otherwise dressed at their edges, and placed together so as to form the entire design in relief, and soldered or otherwise held in that position. The whole is then placed in connection with the battery, when the metal being precipitated upon it, one consolidated plate will be produced, possessing the entire design, and ready for the operation of printing.

The mode which the patentee prefers for joining electrotype moulds together is as follows:—Before placing the electrotype copy of the portion of the design in connection with the battery, the patentee affixes by means of clamps, bars, or ribs (by preference of metal), along the edges of that portion which is intended to be joined to the edges of another portion, and then insulates certain parts, so that the metal shall be precipitated against the bars. The moulds are thus formed with flanges, and are connected together by placing stiff bars of metal against the back of the flanges, and pressing them tightly together by clamps, thereby bringing the edges of the moulds closely in contact.

Claim second.—The mode herein described of joining together engraved, or otherwise executed, printing or embossing plates.

Along the edges of each of the finished or engraved plates where they join another a groove is formed; they are then brought together, and held in that position by means of clamps, and after this they are varnished all over, with the exception of the grooves, which are washed with dilute nitric acid. The whole is then placed in connection with the battery, when metal will be deposited in the grooves, uniting the parts firmly together; or if preferred, the whole of the back of the plate may be coated, instead of the grooves only.

Claim third.—The joining of plain surfaces to the moulds of engraved plates, and then precipitating metal upon them through the agency of voltaic electricity.

To the mould of the engraved plate a plain metallic surface is soldered, and the whole is submitted to the action of the battery, when a plate will be obtained in one mass, containing besides the original design an additional surface, on which another design, or portion of a design, may be engraved.

Claim fourth.—The modes herein described of producing surfaces suitable for printing, embossing, or impressing.

A flat metal surface is provided, and coated over with wax or other suitable substance; the required design is then traced on it, removing those portions thereof down to the metallic plate, which are required to print; this done, the composition is rubbed over with plumbago or other substance that will make it a conductor of electricity, and placed in contact with the battery; metal will then be precipitated, and (the composition being removed) will form the required printing surface.

The process is precisely the same for producing an embossing surface, except that for the same pattern, those portions which were cut away for a printing surface must now be left, and vice versa.

In order to produce a printing or embossing cylinder after this plan, the same course is pursued, except that a hollow cylinder instead of a flat plate is to be used, the interior of which, after the required printing surface has been formed, is filled up by the deposition of metal through the agency of voltaic electricity.

Several other modes of forming surfaces are described.

Claim fifth.—The removing from moulds of plates portions of the design thereon, or in the case of blocks, filling up or stopping out portions thereof, in order to produce plates or blocks suitable for printing in various colors.

From a plate having a design engraved thereon, which it is desired to print in two colors, two moulds are obtained, which will of course be in relief; then with a scraper or tool those portions of the design that are to print one color are removed from one plate, and those portions of the design that are to print the other color, are removed from the other plate. Electrotype copies of the moulds are now obtained, the one possessing the printing portions which are deficient in the other, and by these plates the design may be printed.

In forming blocks, or those surfaces which print from raised portions, moulds are taken in wax, or by electrography, and those hollows which would produce the printing parts desired to be left out are filled up or stopped out; different parts being stopped out in the different moulds, according to the colors intended to be printed by each. They are then placed in connection with the battery, and the required number of copies obtained, in which the raised surfaces will be deposited on one that are deficient in the other.

Claim sixth.—The application and use of moulds, formed by the precipitation of metal through the agency of voltaic electricity, for the purpose of embossing, or impressing buttons, formed of horn, hoof, or tortoise-shell.

A die is engraved with the required device, which is preferred to be formed on copper or silver, and of a convex form, for then the first copy will be ready to be applied as the die. It is then placed in contact with the battery, and a sufficient number of copies obtained, which are mounted in the following manner:—A strong block or plate of metal is provided, having recesses formed therein for receiving the dies, of a sufficient depth to leave an edge round the die, in order to form the edge of the button; the dies are then driven in the recesses, having been first shaped into a regular form.

The dies may be driven out of the recesses by passing a pin through a hole in the bottom of the same.

Other modes are likewise shown of mounting the dies.

Claim seventh.—In producing seals, and bookbinders or other such tools for impressing, the precipitating of the metal through the agency of voltaic electricity, upon the manufactured holder, or a portion thereof, at the same time that it is deposited upon the mould forming the design of such seal or tool.

The holder which is hollow is placed upon the die, and is held closely to the same by passing cement around its edges; the parts on which the metal is not to be deposited are then insulated, and the whole placed in connection with the battery, when the metal will be deposited on the die within the holder, and if the inside of the holder is previously washed with dilute nitric acid it will firmly adhere thereto, thereby forming the holder and seal in one piece.

Claim eighth.—The setting up of moulds, forming a portion of the design of an intended seal, and then precipitating metal upon them through the agency of voltaic electricity.

A set of initials similar to ordinary type is provided, and these are arranged according to the required seal, blank pieces being placed at the sides in order to obtain a sufficient margin; they are then placed in the metallic solution, and metal deposited upon them in the ordinary manner, in order to form the seal.

Various other modes are shown of applying this improvement, as well as the one preceding it.

NOTICE TO PATENTEES.

The following are the names of the patentees whose specifications will be published in the "Inventors' Advocate" on the 28th of August.

William Scamp, of Charlton-terrace, Woolwich, surveyor, duo August 16.

William Samuel Henson, of Allen-street, Lambeth, engineer, due August 16.

George Edward Noon, of Hampstead, engineer, due August 18.

William Orme, of Stourbridge, iron-master, due August 18,

John Collard Drake, of Elm tree-road, St. John's Wood, land-surveyor, due August 18.

William Newton, of Chancery-lane, Middlesex' civil engineer, due August 22.

Thomas William Booker, of Melin Griffiths Works, near Cardiff, iron-master, due August 22.

Jonathan Guy Dashwood, of Ryde, Isle of Wight, plumber, due August 22.

Moses Poole, of Lincoln's Inn, Middlesex, gent., due August 22.

FOREIGN INTELLIGENCE.

FRANCE.

REWARDS FOR TALENT AND VIRTUE.

One of the most interesting exhibitions of Paris has just taken place, viz., the distribution of prizes accorded by the Academie Francaise for the most useful literary works, and the best instances of moral actions during the past year.

The assembly was held at the Institute, in the beautiful circular hall of the Academic, which is arranged like an amphitheatre, with benches of green velvet; the galleries are divided by four statues of Bossuet, Fenelon, Descartes, and Sully, and the ceiling terminates in a highly-wrought dome. There were about sixty members of the Academy present, most of whom wore their costume, which is like the English civilian court dress; the coat is black, profusely embroidered with green leaves.

An interesting detail was first read by the secretary, relative to the nature of the literary productions which were to be rewarded, and he ended by announcing that the prize for poetry (fifteen hundred francs) on the given theme, "The influence of Christian civilisation in the East," had been gained by M. Alfred des Essarts, who would read his poem to the audience.

The young author was then led up to the president, from whom he received a rich gold medal; and, amidst warm plaudits from the members, he read aloud his manuscript.

A prize of 5,000 francs was given to M. Reybaud, for a work refuting the Socialist systems of Saint Simon, Fourier, and Robert Owen.

Of the eight prizes for works most useful to morality, six were to female writers, who, as the secretary gallantly said, had united elegance with power, and purity with industry. Among the translations, Baroness Carlowitz received 2,000f. for a translation of Klopstock's Messiah.

When the literary rewards were terminated, the prizes for virtuous actions were detailed by the directeur, M. de Jouy, who is so well known in England by his "Hermit of the Chaussée D'Antin," published many years ago. A sum of 10,000 francs (£400) was given among four persons for praiseworthy acts: the first prize, of 3,000 francs, to a poor washerwoman, who, although she had seven children of her own, had adopted eight orphans fifteen years ago, and had maintained them through many struggles and difficulties ever since. Another prize was to an officer who had saved the life of a child from a burning house which no one else would enter; and, after his first escape, hearing a female voice from the second floor, exclaiming, "Oh, save my daughter!" regardless of the fearful danger, the young man rushed up a ladder, and found his difficulties increased by the mother and daughter having fainted; however, by almost superhuman exertion, he saved both, at the expense of severe personal injury to himself.

A further sum of 10,000f. was given in smaller portions, for instances of virtue and domestic good conduct in humble life, the parties residing in the provinces. The meeting terminated with the announcement of the prize themes for the ensuing year, and likewise the grand prize to be awarded in 1844, viz. "10,000f. for the best five-act tragedy or comedy, in verse, by a Frenchman, printed and performed in France, which shall be moral and applauded." The members of the French Academy

are alone excluded from trying to gain the prize. 6,000f. will be given among the translators of the most useful ancient or modern works during the half-year; and finally, the sum of 1,500f. "to assist a young writer, or poor artist, whose talent deserves encouragement, to pursue the career of letters or the fine arts."

FRENCH STEAM-SHIPS.

During the discussion on the budget of the Ministry of Marine, in the French Chamber of Peers, Count Tirlet called the attention of the Minister of Marine to the necessity of giving a preference to steam ships of war over sailing ships, in order that France might be placed on a footing of greater equality with England. The Minister of Marine admitted that steam was a powerful element for naval warfare, but it would be a great mistake to assign to it exclusive preference. Sailing vessels had many advantages which steam-ships could not possess. It was also a mistake to suppose that there was a great superiority on the part of the English as to war steamers. Nobody could deny that the superiority was very great as regarded the use of steam in maritime trade, but this was not the case as regarded the Royal Navy. He was prepared to prove that the French had more steamers of war than the English.

The collection of living animals in the Garden of Plants, in Paris, has lately had added to it a specimen never before seen alive in any zoological collection of Europe. It is a monitor lizard, from Brazils, three feet in length, two-thirds of which are formed by the tail. The skin has the appearance of black chagrin, spotted with bright yellow. Although possessing great strength, it is harmless and gentle, and frequently darts from its mouth a long forked tongue.

A large woollen-cloth manufactory, at Cones, Monesties in the Aude, belonging to M. Luce, was set on fire by lightning, a few days since, and totally destroyed. Several hundred hands are out of employment by this accident.

The *Journal du Rhône* states that a peasant of the environs of Bourgoin had met his death by eating cherries, on which caterpillars had been feeding. The caterpillars it is said had deposited on the fruit a matter of so poisonous a character that death ensued in half an hour. It is, however, more probable that death was caused by indigestion from the quantity of fruit eaten.

Messrs. Mazeline, Brothers, are building a manufactory on the banks of the Vauban canal, which in case of need would be able to construct steam-engines of the greatest power. The proportions of this manufactory will be truly gigantic, for the whole establishment occupies a space which cannot be less than 6,000 square metres. The walls of an immense workshop for fitting-up machinery have already been raised, which will be 33 metres by 50, making a superficies of 1,650 square metres. There is also a fine court-yard, where two houses will be built to be appropriated to the proprietors, and a little further on a building has been erected for the accommodation of the workmen, which is capable of containing 24 families. This is an example worthy of being followed, and which we believe will be followed by the proprietors in the neighbourhood, for we already observe a very pretty building nearly finished for the accommodation of the workmen in an establishment in the immediate vicinity. To these immense workshops an iron foundry must be added, which Messrs. Lepaige have established close by, and which is already in operation. It is not constructed however on the large scale which characterises the whole of Messrs. Mazeline's manufactory, which when it is finished will be the largest in the department.—*Journal de L'Arrondissement du Havre.*

BELGIUM.

The number of persons whose names are inscribed on the lists at Brussels as having articles to present at the approaching exhibition of the products of national industry, amounts to 220 in Brussels alone. There were only 193 at the exhibition of 1835. The commissioners appointed to examine the different articles to be exhibited last week, proceeded to the manufactories in different parts of the kingdom of the persons whose names were on the lists, for the purpose of examining the articles offered for exhibition, and to determine whether they should be received.

A royal railway carriage, for the use of the King of the Belgians, is now constructing at the manufactory connected with the railway department.

A watering machine for watering the railroads is now making at the railway manufactory at Mechlin, which is the central point of the Belgian system of railways. The apparatus consists of a tube pierced with holes similar to those in our watering carts, and it is to be supplied with water from the water-tank of the locomotive. The object is to lay the dust on the road, which proves very disagreeable to the passengers.

GERMANY.

The *Royal Almanack* of Saxony supplies the following statistical account:—The population of the whole kingdom amounts to 1,687,141. The produce of the mines for 1839 was 7,000,000 frs. The woollen manufactories employ between 3,000 and 4,000 looms, making annually 160,000 pieces of cloth. The principal silk factories are at Annaberg, Penig, and Trankenberg. In the budget of the finances, from 1840 to 1842, the revenue is 15,896,176 frs., and the expenses 15,214,996 frs. The national debt amounts to 36,908,327 frs.

According to the last official census of Vienna, says the *Austrian Observer*, "the population of this capital amounted in 1840 to 357,927, of whom 304,298 were Austrians, and the rest foreigners. The increase since 1837 is 23,427, but these are chiefly foreigners, residing in the suburbs; the city, properly so called, having only 52,593 inhabitants. The national manufactures have within the last ten years made immense progress. Lower Austria, the population of which is 1,400,000, has 400 factories, and 59,900 workshops. Confining our notice to the iron works, we have to state that in 1839 Austria produced 3,324,114 quintals of bars, and 522,843 quintals of cast-iron."

RAILWAY INTELLIGENCE,

DOMESTIC AND FOREIGN.

London and Brighton Railway.—It was generally reported and expected, that the railway would open to Hayward's-heath, twelve miles from Brighton, on Monday, the 28th instant, indeed the contracts for coke, &c. were advertised, with the proviso that portions should be delivered by Saturday next. The opening is now deferred until the 28th of July, by which time, it is expected, the whole line will be finished. Clayton tunnel, the longest and only one remaining unfinished, will be keyed in on Monday next.

Irish Railways.—The Government having now abandoned their intention of making railways in Ireland at the public expense, we understand that the railway from Dublin to Kilkenny, which has been awaiting the decision of the Government for the last three years, will be immediately commenced. The engineers are now engaged in preparing the working plans for the first portion of the line from Dublin to Naas, and are in communication with contractors as to the formation of the works on peculiarly advantageous terms. Agreements were entered into last summer for the purchase of the whole land required, within the sum mentioned in the original estimate, in anticipation of the progress of the undertaking.

Eastern Counties Railway.—The Kelvedon portion of the Eastern Counties Railway, recently commenced, is steadily progressing. The Watering farm house and buildings have been rased to the ground, and the Coggeshall road will shortly be diverted in order that a bridge may be erected, on which the line will pass over it. The course through Feering Park has been set out. The line will cross the road leading to Lord Western's mansion within about twenty rods of the church.

Fleetwood Railway.—We understand the managers of the Fleetwood Railway Company have at length succeeded in making satisfactory arrangements for the erection of a pier on Roa Island, and that, all impediments being removed, the work will be forthwith commenced; so that, in a very short time, the steamers will be able to ply constantly between that place and Fleetwood, and land their passengers at any hour of the day. This is a most important addition to the chain of communication between the great manufacturing districts and the north; and, as it has become the principal, if not the only route for tourists to the magnificent scenery of Cumberland and Westmoreland, there can be little doubt that, were it continued by Whitehaven, it would, in nineteen cases out of twenty, be preferred by travellers of every description, as not only the quickest, but by far the most agreeable route to Cumberland and Scotland.—*Whitehaven Herald.*

RAILWAY ACCIDENTS.

Railway Accident.—On Monday last a person named George Colley was thrown on the Manchester and Sheffield Railway by a horse which he was leading off the line near Glossop. A wagon came up at the time, and, before he could rise, went over him. He was instantly taken to the infirmary, where he died the next day of a compound fracture of the leg.—*Manchester Chronicle.*

An Engine-driver Killed when Intoxicated.—On Friday evening a person named Wood, who was employed as an engine-driver on the Manchester and Liverpool Railway, had the charge of the return train from the Newton races, and, being in a state of intoxication, he left his post at the engine and went on the tender, from whence he fell, and was instantly crushed to death and bruised in a most shocking manner, the whole of the train having passed over him.—*Manchester Chronicle.*

Fatal Accident on the London and Greenwich Railway.—An inquest was held on Friday evening at Guy's Hospital, on the body of James Dulderfield, aged 32, a laborer upon the Greenwich Railway. Andrew Conders, a laborer upon the same line as the decased, said that on the 28th of May, about three o'clock in the afternoon, he was at work near the Spa-road, Bermondsey, when he saw a train of carriages proceeding towards London. Before they reached him some of the carriages unexpectedly got off the line. Another road by the side of the Greenwich line was being built, and the foremost carriage fell upon it, and after the train had been stopped he saw the breaksman lying by the side with his leg broken. He had seen the deceased about five minutes before the train came in sight; but he did not see him meet with the accident which had caused his death. He believed that the carriages had been thrown off the rails by some wooden posts which had been left lying across them. Mr. Wilson, the house surgeon, said deceased was admitted on the 28th of May, having received an injury to the spine, of which he died on Wednesday evening last. The deceased said, shortly after his admission, that he had fallen a distance of thirty feet from the brickwork to the bank. The Coroner regretted the absence of any testimony directly showing how deceased's fall had been occasioned, and adjourned the inquiry until Wednesday. On

that day tho inquest was resumed, and a verdict of "accidental death" was returned.

FOREIGN RAILWAYS.

Railroads in Germany.—The *Frankfort Journal* states, that it is in contemplation to construct four different lines of railroads, to commence at Breslau. The first is already commenced. It will lead from Breslau to Ohlan, and thence to Oppelu, 14 German miles. Secondly, a line from Breslau to Schweidnitz, in Freiburg; the vicinity of the Silesian mountains, so rich in minerals, it is considered will cause much traffic on this line. Thirdly, a line from Breslau to Frankfort upon the Oder. Prince Kolorath and other proprietors of Lower Silesia are to have the management of this line. Fourthly, a line from Breslau through Leignitz and Gorlitz to Dresden; the merchants of Breslau are particularly interested in the completion of this line. The execution of it will, however, be attended with some difficulty.

The two Railroads to Versailles. — The *Courrier Français* informs us that the proposed junction of the two railways to Versailles has experienced obstacles from tho Government, without whose consent it cannot be effected. The company of the Versailles and Meudon railway having borrowed five millions of francs from the State, the interest of which amounts with the sinking fund to 450,000frs. a year, the company, unable to pay this sum, as the receipts of the railway scarcely cover the expenses, have applied for a prolongation for a few years of the reimbursement of this debt, and the Ministry is said to havo recognised the equity of the demand, but declines giving any direct pledge on the subject, and the company of the Versailles and St. Cloud railway refuses to treat without some guarantee against being suddenly called upon to fulfil the conditions upon which the money was lent. The *Courrier* urges the Government to facilitate the proposed arrangement between the two companies as the only means of preventing the ruin of both, and putting an end to the depreciation in the value of the shares, which is a discouragemont to every attempt at the formation of other railways.

The works of the railroad at Valenciennes are at length on the point of commencing. Two hundred Belgian workmen have arrived to give their assistance. It is not yet known if many parts will be commenced at the same time. With respect to the line from Quierrain to Mons, our neighbours are indefatigable, and progress with a rapidity worthy of promise. These works are already considerably advanced.—*Moniteur Industriel.*

TO CORRESPONDENTS.

"O. Z." *will find in No. 71 of the* Inventors' Advocate, *a long account of* Lord Oxmantown's *improvements in reflecting telescopes.*

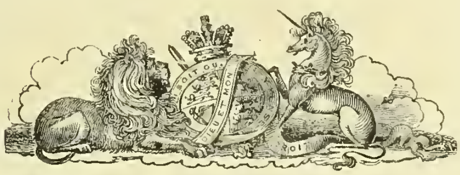
An "Inventor" cannot safely exhibit the contrivance he alludes to before his patent is sealed.

The Index to the Fourth Volume of the Inventors' Advocate, *which this number completes, is in preparation, and, with the title, will shortly be published.*

Gratuitous Copies *of our Journal have been forwarded to a number of Individuals interested in some Patent or Invention, of which notice has been taken in our number of today.*

"The Inventors' Advocate" *is published every* Saturday Morning, *at 7* o'Clock; and is regularly issued in Monthly Parts, of which 1 *to* 25 are now Ready.

"The Inventors' Advocate" is also published in Volumes, containing the Nos. of every 6 months.



THE
INVENTORS' ADVOCATE,
AND
JOURNAL OF INDUSTRY.

SATURDAY, JUNE 26, 1841.

In the turmoil of a general election little else is attended to than party politics, yet there are considerations appropriate to such a time to which sober-minded men, who look to practical objects rather than to contentions for place and power, would do well to direct their attention. The neglect which the improvements of our manufactures has experienced in Parliament shows the necessity of exertion on the part of all who have the true interests of their country at heart to send representatives to the House of Commons of enlarged practical views, who are acquainted with the processes of manufacture, and are impressed with the importance of their continued advance and improvement. The contending factions of Liberals and Conservatives have alike shown indifference to the inventive genius of their countrymen; and unless there be formed an independent party, to protect and foster the interests of manufacturing industry, apart from political considerations, we fear there is little chance of their obtaining proper attention, whichever party come victorious from the contest. We almost despair, indeed, of ever seeing the requisite attention bestowed on plans for improving and enlarging manufacturing processes in a legislative assembly elected under the stimulus of party excitement, and who view the time occupied in discussing matters relating to the improvement of the manufacturing arts as lost opportunity for rhetorical display.

The fact is, tho House of Commons is not an assembly for doing business—it is a mere chamber for speaking, and an arena for party conflict. Even were the two Houses of Parliament differently constituted, and were disposed to devote attention to the business-interests of the country, the nature of those large public assemblies, and the press of matters relating to civil and political government, would prevent them.

There has been for some time past a growing conviction, which becomes stronger and stronger every year, that the present Houses of Parliament are quite inadequate to discharge properly the immense accumulation of business of all kinds that is constantly brought before them, and is either "disposed of" negatively, or is added, in the form of bills passed, to the statute books; increasing from year to year the impenetrable unintelligible mass of confused verbiage which all British subjects are bound to understand and obey!

The appointment of some inferior legislative assembly for the consideration of matters relating to the detail interests of the community, seems now indispensable, not only for the purpose of more efficiently and less expensively effecting such measures, but as a means of relieving both Houses of Parliament of a mass of business which can never be there properly considered, and which occupies time that might be employed more advantageously in discussing subjects of greater general interest.

A legislative assembly or board of this kind might be profitably engaged in arranging and maturing the different measures submitted to them for the final approval of the superior chambers; so that each year's addition to the laws, at least, might be uniform, consistent, and intelligible. In a board of this kind, whether elective or appointed, measures for the improvements of manufactures, and for the encouragement of inventive genius, might be appropriately originated; and after receiving the sanction of such authority, they would be introduced in the Houses of Parliament with nearly a certainty of attracting attention and ensuring adoption.

The gross jobbing which was formerly practised in private committees of the House of Commons has been in a great measure checked by the recent amended regulations; yet, even as now constituted, they are far from being fit or impartial tribunals for the examination and determination of the

numerous important matters that are brought before them. Most, if not all, the business that is now conducted in private committees of the House of Commons might be much more satisfactorily discharged by distinct deliberative bodies, who would be responsible for the impartiality and ability of their decisions. The pettifogging manner of legislation on private bills, at present, adds act after act, in an interminable maze, to the statutes; whereas, by an enlarged and comprehensive view of all the matters which are annually made the objects of private bills, the whole might be comprised in a few intelligible acts, after all the details had been examined and their merits tested by the board appointed for that purpose.

The first step, however, towards procuring the adoption of any practicable plan of this kind, is to ensure the election of a number of representatives in Parliament of independent principles and enlarged views, who would be able fearlessly and ably to expose the sophistry by which old forms and precedents are defended and upheld against all the dictates of common sense.

Nothing more clearly betokens a narrow mind than a close pertinacious adherence to forms and precedents, when the circumstances which originally made them valuable have been entirely altered; and when, instead of serving a good purpose, they become the hindrance to improvement. The dread of innovation produces a seriously depressing effect on the enterprise of the nation; and in no case more so than in the preservation of the old forms of conducting the legislative business of the country. Though the number of measures now brought before the Houses of Parliament is multiplied a hundred-fold in quantity, and magnified equally in importance, the means of conducting it remains the same as it was centuries ago; and yet the slightest attempt to relieve the House of Commons of this accumulated mass of business, which it has not the means of transacting, is treated by the sticklers for the privileges of Parliament as a breach of the constitution. In their anxiety to preserve ancient practices they entirely overlook the objects for which those practices were instituted, and would sacrifice substantial good at the shrine of empty form. We trust that with the progress of enlightenment the common sense of the nation will acquire sufficient strength to clear away the cobwebs by which it is now entangled and obscured, and that good practical measures will be considered on their merits alone, freed from party prejudices and unshackled by antiquated precedents.

NEW INVENTIONS.

RETTIE'S PATENT SIGNAL LAMP.

We inserted, in a late number of our journal, a short description of Mr. Rettie's signals, with a letter from the inventor, in which he promised a complete description of his newly-invented signal lamp and code of signals. We have this week been favored by drawings of both, but the "description" is still wanting; and it is difficult, without a diagram or the inventor's explanation, to afford a correct idea of the nature of the invention. The principle of the signal lamp, however, is the same as that proposed by Mr. Bain, which we lately noticed. The colored glasses which indicate the course the ship is steering are shown on the front of a powerful lamp, which has a revolving top for protecting the lights and producing a clear steady flame. The colored glasses, green and red, are moved horizontally, and a space between them shows a clear white light. The signals are made by hand, either by ropes or handles, and not, as in Mr. Bain's plan, by the movement of the helm, which Mr. Rettie conceives would be too unsteady and uncertain a mode. Mr. Rettie's signals for sailing ships cannot be explained without diagrams. They are more complicated than the lamp signals, and we do not see why the lamp should not be made to answer all the required purposes which the variously placed lights are intended to serve.

RAILWAY TRAIN CONTROLLER.

Several contrivances for controlling the speed of railway carriages have lately been patented, which are in principle nearly similar to each other. We recently described Mr. Hancock's invention, which consists in making that part of the machinery of the locomotive which turns off the steam, directs it through the whistle, and puts down the breaks, connected with a lever that is acted on by a fixed bar raised on the line. Another invention, the abstract of the specification of which was subsequently published in our journal, proposed to accomplish the same objects by similar contrivances; and among our specifications this day will be found a description of an invention by Mr. Lindo, for improvements in locomotives and carriages, in which, also, the same effects are produced, though the means he employs are in some respects different. It has been objected to Mr. Hancock's invention, that the force of the concussion of the lever against the bar would either break or damage the mechanism. Mr. Lindo's contrivance obviates this difficulty, as the action is produced by the gravitating power of a weight; the effect of the concussion being merely to knock away the prop by which the weight is supported. The steam is thus shut off, and sent through the whistle, and the breaks are let down with the exertion of scarcely any force extraneous to the engine itself. There are many other parts of Mr. Lindo's invention which promise to effect improvements and give additional safety to railway travelling, for the description of which we must refer to our abstract of the specification in another column.

NEW PROCESS FOR HARDENING PLASTER.

Messrs. Greenwood and Savage have succeeded in communicating to plaster the hardness of a good calcareous stone. Pulverised gypsum, prepared according to their process, is used with success either in castings or as plaster. We have seen two small casts very well executed, and which demonstrate that notwithstanding this plaster becomes so hard when dry, it can easily be moulded when it is wet. Messrs. Greenwood and Savage have erected a manufactory at Alford, which is at the present time in active operation. The following is the method of fabrication. The plaster is first dried in a kiln, in order to disperse the water of crystallisation. It is afterwards thrown into an aqueous bath saturated with alum; there it remains for about six hours; it is then exposed to the open air, till it becomes dry. In this state it is taken to the kiln to be heated a second time, which operation is not completed till the plaster becomes of a red brown color. All the operations are then finished. When the plaster has undergone this process, it is immediately taken to the mill to be pulverised; it is then put into casks, ready for sale. In using this plaster, it is mixed like common plaster, and it is applied to the surfaces prepared for its reception, particular care being taken that they are previously moistened. The hardening takes place in the course of a few hours. It adheres strongly to wood, stone, iron, plaster, &c. Mixed with an equal quantity of sand, it acquires strong adhesive resisting properties.

AIR ENGINES.

The French papers contain a notice of a new air-engine, professing to have great advantages as a propeller of carriages on railways and common roads. The inventors are Messrs. Andraud and Terrié du Motay. They propose to work their locomotives by compressed air admitted into strong reservoirs to be placed on the carriages. These reservoirs they propose to replenish at stations on the road, from large reservoirs containing air already compressed either by wind or water power, or even by the employment of steam engines. The application of this compressed air to the driving of the carriages is obvious enough by the usual agents of cylinders and cranked axles, but they propose to simplify the machinery, and by making the pistons work the valves, to do away with the eccentrics. It seems they have also a machine for heating the air, and thus adding to its elasticity. The driving wheels they propose to be independent the one of the other, and to govern the course of the carriage, if it is wanted, they merely regulate the quantity of compressed air to either wheel. According to their account, a carriage of 3 metres long, 2 high, and 1½ broad, is sufficient to carry its own aliment of compressed air and transport eight persons; and they think by a well-constructed carriage they might run three or four leagues without a fresh supply of air.

ORIGINAL REPORTS OF SCIENTIFIC MEETINGS.

(*Contributed expressly to the Inventors' Advocate.*)

MEETINGS OF THE SCIENTIFIC BODIES OF LONDON,—FOR THE WEEK COMMENCING JUNE 28, 1841.

Monday	Geographical Society	9 P.M.
Friday	Botanical Society	8 P.M.
Saturday	Mathematical Society	8 P.M.

METEOROLOGICAL SOCIETY.

June 8. Dr. Lee, F.R.S., &c., in the Chair.

After the minutes of the previous meeting had been read, and several donations of books to the library announced, Captain Eaton, Rev. Charles Blathwayt, Swanswick, near Bath, Mr. W. Ick, of Birmingham, Mr. W. C. Cox, of Devonport, and Messrs. Bursill, Ronketti, and Cesella, of London, were unanimously elected members. Professors Hare and Hague, of Philadelphia, were elected associates, and Mr. Andrew Crosse, of Taunton, an honorary member. Lieut. Morrison, R.N., read an interesting paper "On the Winds of March, April, and May," from which the following ratio appeared, taking them *West to East.*

	West.	East.
March	100	14
April	100	58
May	100	75

In March there were 19 calms during 104 observations, or about one fifth of the whole. In April, 5 calms in 87 observations, or about one-seventeenth. In May, 8 calms in 106 observations, or about one-thirteenth.

The mean velocity of the wind per minute was estimated, in March, 51 yards, April, 14 yards, and May, 29 yards.

The secretary read a paper from Mr. Henry Lawson, F.R.S., of Hereford, giving an account of the improvements of his thermometer stand, which is so constructed that the thermometer, barometer, hygrometer, rain-gauge, &c., are all upon the same platform, and so arranged as to obtain both the maximum heat in the shade and in the sun; the object of this instrument is to obtain, if it were universally used, simultaneous observations in every part of the world, and made under precisely the same circumstances, by which means more accurate deductions could be made, from tables kept at various stations, than can possibly be done upon the present system pursued by meteorologists.

The secretary read a paper from Wm. Stocken, Esq., of Baldock, in which the writer commences by stating, that "the study of meteorology impresses upon the contemplative mind the most sublime and exalted ideas of the Great Architect of the universe,

in constructing and maintaining so important a fluid as that which surrounds our globe; and many persons, he conceives, would be induced to enter into the field of investigation, if a few plain and simple rules were laid down, and made public, as directions for observation and prediction."*

"It will be desirable," says the author of this paper, "that every exertion be used to become acquainted with the composition of the earth's atmosphere, and in what manner and to what extent it may be affected by the action of the earth's internal gases, and other causes. Whether, and to what extent, and in what proportions, the effects produced are chemical, electrical, or magnetic, or whether the combined action of the whole." The author then enters into the composition of the atmosphere, and shows its component parts, both by measure and weight, particularises the various atmospheric gases, and then proceeds to show the disturbing forces of the planets upon those gases; "for," says the writer, "were there no disturbing forces, the rotatory motion of the earth would carry the surrounding fluid gently along with it, and its universal and annual motions; but as the earth's axis is inclined considerably from a perpendicular, and the sun being possessed of powerful attractive properties, it necessarily follows, that the surrounding fluid must be in a constant state of motion; for in the diurnal motion of the earth that portion of it which is directly opposite to the sun will be powerfully acted upon, and the fluid in a degree retarded, or prevented from revolving with the earth. The moon is also a most powerful disturbing body to the earth's atmosphere. If the moon's influence on the *waters* is so great as to cause a considerable rise from their general level at the time when it is directly opposite, or rather as soon after as its directly opposite influence can be made to act upon the waters, its influence must be great upon the lighter particles which surround the earth. The several planets too, as they come into the neighbourhood of each other and of the earth, have their several disturbing forces; so much so, that astronomers are under the necessity of equating for those disturbing forces in all their calculations. Surely then if these several bodies disturb and retard the mighty mass of matter contained in each and every of them as they pass each other, a similar effect must be produced by them upon their respective atmospheres; but whether these disturbing forces are occasioned by magnetic, electric, or chemical action, or the whole, or perhaps other properties combined, is yet to be discovered." The paper concluded with some general instructions for practical meteorologists in ascertaining the effects of planetary bodies upon each other's atmospheres.

The secretary read another paper from Mr. Orlando Whistlecraft, of Thwaite, Suffolk, being the conclusion of a former paper "On periods of extraordinary heat in England."

A meteorological register kept at Edinburgh in 1734 and 1735 was presented by Mr. W. J. Simmonite.

This table, although more than a century old, showed the daily state of the barometer, thermometer, hygrometer, direction and force of the wind, fall of rain, &c., showing, as the contributor of it justly observes, how little we have advanced in instrumental results from those of our predecessors who existed a century ago.

Meteorological tables were then compared from various places in England, besides others from Ohio, Sydney, and South Australia.

This being the last meeting of the session, the following resolution was passed, viz.:—"That with a view to obtain unanimity of observation, this society recommends that the *meteorological day* shall be understood to signify the 24 hours which constitute the natural day and following night, or from sunrise to sunrise again."

The meeting then adjourned till November.

* Rules for observations are laid down in the Meteorological Society's Transactions, Vol. I.

MICROSCOPICAL SOCIETY.

June 24. Professor Owen, F.R.S., &c., President in the Chair.

The Chairman stated, after the usual preliminary business had been completed, that the council had given orders for three of the most perfect microscopes that can be manufactured; they had therefore requested each of the three best makers, Messrs. Powell, A. Ross, and Smith, to send in a standard instrument, made according to their own particular views. That of Mr. Powell is to cost 90 guineas; that of Mr. Ross, 60 guineas, and that of Mr. Smith, 40 guineas. The Chairman also informed the meeting, that Dr. Arthur Farre had that evening resigned the office of secretary, which he had so well filled since the establishment of the society.

Mr. G. Jackson proposed that a vote of thanks be given to Dr. Farre, for his assiduity and attention to the affairs of the institution, which was seconded by Mr. Edwards, and carried unanimously.

The Secretary then read an abstract of the papers read at the last meeting by Dr. Haro, of Metz, being "Observations on the Products of Animal Infusoria," which was revived in order to excite discussion.

Mr. Cornelius Varley, in alluding to some facts mentioned at the previous meeting, is of opinion that animal life is even produced by the decomposition of animalcules themselves—this he has frequently observed in *Monoculus*, when the dead specimens are found to be filled with myriads of a very much smaller kind. He also alluded to a peculiar arrangement assumed by the spiral animalcule; when a drop of water is allowed to dry in which they exist, they unite by their tails, giving to the exterior of the water, partially or wholly dried, a fringed appearance. He is inclined to consider the test for albumen and fibrin, that is, the existence of the genus *Monas*, the result of decomposition of the former, and the genus *Vibrio*, that of the latter, to be nothing more than a mere accidental circumstance.

Mr. E. J. Quekett made some remarks, and exhibited some specimens of water from the London Docks, which attracted his attention, two or three weeks back, when crossing one of the bridges. This water was of a blood red color; on examination, Mr. Quekett finds this color to be owing to the presence of a multitude of small entomostracous animals, of the genus *Monoculus*, having a bright red spot within it. They occur in vast numbers at certain seasons only, such as in warm and very tranquil weather, and usually form about one-sixth of the bulk of the water. The common people call it *spawn*.

Mr. Cornelius Varley stated to the meeting that he had Nitella in fructification, both the globule and the seed—they are not yet quite ripe, but when they arrive at that state, he expects to meet with the same moving particles which he some years since pointed out in Chara, &c.

Mr. Daniel Cooper observed, that he had that morning met with specimens of the fresh-water sponge in a living state, obtained from some logs of timber, which were stated to have been lying in the Commercial Dock. On the same wood he also gathered specimens of *Alcyonidium stigmarium.*

The meeting then adjourned until July 21st.

MR. WARNER'S INVENTION.

In the House of Commons on Monday Mr. Wakley again brought forward the subject of Mr. Warner's invention of a destructive projectile. He said that finding a great deal of sympathy was entertained towards Mr. Warner, and that a strong feeling existed in his favor out of doors, he was anxious not to let the question rest. It appeared from Mr. Walesby's statement, and from the article in the *Times*, that Mr. Warner's invention had been brought under the notice of his late Majesty William IV., so far back as 1830, and that immediately afterwards his Majesty referred the investigation of it to the late Admiral Keates, who had given it his attention for nearly two years, and who was afterwards assisted by the late Admiral Hardy. Various communications passed between Mr. Warner and those two admirals, and sundry communications were made to the Treasury on the subject by Mr. Warner, about the period alluded to, and on his return he found Sir James Graham at the head of the Admiralty. On applying to him he was desirous of referring the question to a board, and shortly afterwards a committee of naval officers was appointed, the chairman of which was Admiral Sir R. Stopford. Before any decision could be obtained, Sir R. Stopford left for the Mediterranean, and the matter rested till 1838, when Mr. Warner brought the matter under the notice of Viscount Melbourne, who was desirous of referring the subject to a board. To this Mr. Warner objected, on account of the publicity which would thereby be given to his invention, and this objection had been raised previously by Admiral Stopford. It was then referred to Lieutenant Webster, who was directed to make his report to the Admiralty, Viscount Melbourne having concurred in Lieutenant Webster's appointment. The Lords of the Admiralty did not think it worth their while to notice the communication of the First Lord of the Treasury, or to forward the report of Lieutenant Webster. Mr. Wakley thought that they ought to have the report of Lieutenant Webster, in order that as he had been appointed to the investigation by Lord Melbourne, and was a stranger to Captain Warner, the country might know what was that officer's opinion of it. The report, which was dated 13th September, 1839, was as follows:—

"28 B, Manchester-street, Manchester-square, Oct. 10, 1839.

"My Lord—I beg to inform your lordship that the principle and practice of the various projects, of which Captain Warner is the inventor, having been fully shown and explained to me by that gentleman, and being most thoroughly satisfied of their effectiveness, an outline of the same project was, on Monday, the 16th of September last, duly reported by me to Sir William Parker, with an urgent request on my part that, seeing the extreme importance of the matter, not a moment's delay might be incurred in laying the whole before your lordship, together with my distinctly-expressed opinion, that their merits are so extraordinary as to vest the absolute sovereignty of the seas in the hands of the first power that shall adopt them. I am fully convinced that it is utterly impossible for anything that floats to resist them for a single moment, either at close quarters or at any given distance, even to a range of five or six miles. The strongest fortifications in Europe could not withstand these extraordinary powers for a single hour. In river ways and against stockades, as in India, the largest armies would be annihilated without a chance of escape; and the most difficult mountain passes would be utterly untenable against their operation. The country would thus be rendered impregnable, for 100 sail of the line would be useless against a single vessel so constructed; and whenever it should be necessary to call this power into action, its effects could be attained by a trifling expense, and at the shortest notice. I submit, however, to your lordship, that the inventions should lie dormant until a case of emergency, and that the secret should be confined to the projector, the Crown, and your lordship's own breast; not a whisper of its existence should be suffered to get abroad. I solemnly declare to your lordship, that I consider the whole country deeply indebted to Captain Warner for these inventions, were they to cost the nation five times what he asks for them; and not less gratitude is due to him for the patience, forbearance, and self-denial he has shown, when with so mighty a secret in his bosom, his own interests would have been established in any other land by the least disclosure. I therefore earnestly intreat your lordship no longer to neglect a man upon whom the existence of the country depends.

"I have the honor to be, &c.,

"W. WEBSTER, Lieut. (A) R. N.

"Right Hon. Lord Viscount Melbourne."

This was the report of the officer who, under the sanction of Lord Melbourne, was appointed to make the investigation, and to report upon it. And how was Captain Warner treated? If he had been the greatest impostor he could not have been treated with greater neglect; and Lieutenant Webster, an officer in her Majesty's service, who had been in seventeen engagements, met with similar treatment. But other parties had been treated worse than these gentlemen, and they were the British public. Mr. Wakley thought Captain Warner ought to be informed that the house sympathised with his case, which might prevent his carrying his invention to a foreign country. Treatment of this description was but too frequently the fate of ingenious men; they were regarded as fools or fanatics, and their projects denounced as folly by those who would not take the trouble to understand them. If any man had said but a short time ago that a vessel could sail from America to England in eleven days, he would have been called a fool and a madman. A similar fate would have befallen the man who would have looked forward to the day when a man could breakfast in Manchester and dine in London. He (Mr. Wakley) would beg the house to remember that the experiment in February had taken place in the presence of Sir R. Peel, Sir H. Hardinge, and Sir George Murray. Sir George Murray said that Captain Warner was a man whose frankness of manners, intelligence of conversation, and whole deportment were of a nature to inspire confidence, and that his practical knowledge afforded the strongest grounds for belief that his expectations would, to a great extent at least, if not wholly, be accomplished. Since he (Mr. Wakley) had last noticed the subject, he had seen an officer who was present at the experiment, and he had learnt from him, as well as from other accounts, that instead of the statements respecting it being beyond the truth they were actually far below it. Under these circumstances, he was anxious that the report should be laid before the house, and he trusted that in another Parliament Captain Warner would be rescued from the hands of the Lords of the Admiralty. It had been reported, upon good authority, that Mr. Warner had been offered a sum amounting to nearly £300,000 for his discovery by a foreign government; and probably that discussion might induce others to offer still larger sums, but from the past conduct of Mr. Warner, he (Mr. Wakley) had no fear of him. He did not believe that three times the sum would induce him to do anything which could prove injurious to his native country. Still the temptation ought to be removed. Mr. Wakley concluded by moving for a copy of the correspondence between the First Lord of the Treasury and Mr. Warner, as he understood there had been no correspondence between Mr. Warner and the Lords of the Admiralty.

Lord J. Russell wished that the house should not agree to a motion for the production of any correspondence relating to the discovery at that moment, or until they had heard the explanations of those who were professionally acquainted with the subject. Even if it were admitted that Mr. Warner had been unfairly treated, and that he was entitled to a large sum for his discovery, still it might not be for the advantage of the country that the correspondence should be furnished. He hoped, therefore, that the motion would not be pressed. He had reason to believe, from the information he had received, that Lieutenant Webster, who made a report on the subject, was not the person originally appointed by the First Lord of the Treasury, or the Board of Admiralty, for the purpose of conducting the investigation; but he had come forward of his own accord, as the friend of Mr. Warner; and his report could not, consequently, have the same authority as if he had been commissioned to conduct the undertaking. Lord Melbourne had subsequently referred the matter to Sir W. Parker, who had entered into a negotiation with Mr. Warner. He (Lord John Russell) had always understood that the point upon which that negotiation had terminated unsuccessfully was a difference of opinion as to the propriety of Mr. Warner's communicating the means by which he produced the alleged effect. Mr. Warner was unwilling to communicate the secret; while Sir W. Parker thought such a communication necessary, in order to ascertain to what extent the discovery could be made available. He (Lord J. Russell) would not say whether or not Sir William Parker was right, or what was the nature of the conditions required between the parties. He thought it better that the question should again be raised in the presence of persons who might be able to speak from their own knowledge upon the subject, and that they should not now insist upon the production of any correspondence. He certainly thought that some explanation should be given upon the matter which might satisfy the house and the country, and that some further negotiations should be commenced with Mr. Warner; but he repeated that he did not think the matter should be pressed upon that occasion.

Sir Robert Inglis said he owed it to Captain Warner to say that he had seen two letters from an individual second only as an authority to the Duke of Wellington himself, giving a strong opinion in favor of the invention.

Viscount Ingestre regretted that so important an invention should be lost to the country through the apathy of the government. The Admiralty had treated the inventor as an enthusiast, if not as a madman. Perhaps he (Lord Ingestre), too, would be stigmatised as an impostor, or as one bereft of understanding; but, nevertheless, he would declare that this invention demanded the attention of whatever government might be entrusted with the affairs of the country.

Mr. W. Cowper said that when Captain Warner first applied to Viscount Melbourne he was referred to the Admiralty, and by the Admiralty he was told that it would be more satisfactory if some naval person were to speak to the efficacy of the invention. Then it was that Captain Warner himself suggested Lieutenant Webster as a fit person, and as being, as he (Mr. Cowper) understood, Captain Warner's friend. Lieutenant Webster therefore went to the Admiralty as a person acquainted with the invention, and a friend of Captain Warner's, and not as a person originally appointed by the Admiralty. The principal reason why the negotiation between Captain Warner and the Admiralty did not turn out satisfactorily was, that Captain Warner declined complying with the conditions required by the Admiralty as regarded the number of persons to whom the secret should be entrusted, and whom they should be. The Master-General of the Ordnance had offered to refer the matter to a committee of engineers, and other officers, but that offer was declined by Captain Warner.

Mr. Wakley said, he was in some degree satisfied with the explanation of Lord John Russell. In the hope that the subject would be pressed on the house by the attention of some member next session, if he (Mr. Wakley) should not have a seat in that house, he should withdraw the motion.

The motion was then withdrawn.

POPULATION AND RESOURCES OF THE UNITED STATES.

The Philadelphia correspondent of the *Morning Chronicle* gives in his communication, dated May 20th, statistical tables of the population and resources of the United States, distinguishing the returns from each State. The substance of these returns we subjoin, placed in an aggregate form.

It appears that, from some of the counties no returns have been, and probably will not be received, therefore in those the amount of population has been estimated from imperfect data. The total population in 1840 is stated to have been 17,100,578. The places for which no returns were made were nine Georgia counties, five in Alabama, and Carter county, Kentucky, but all are estimated in the above total. Total slaves, in 1840, about 2,400,000; and free colored persons, 373,000. The returns handed in, enumerate 2,369,953 slaves, and 371,606 free colored persons. The present population (1841) of the United States is about 17,300,000. The population of the United States in 1790 was 3,729,326; in 1800, 5,309,753; in 1810, 7,239,903; in 1820, 9,638,166; in 1830, 12,856,407; in 1840, 17,100,572.

Under the head "Agricultural Statistics," the produce of the land in corn and potatoes of the different states is thus stated in the aggregate:—

Bushels of wheat	66,089,947
Other grain	419,776,871
Potatoes	102,459,926
Bushels	588,326,744
Estimate for Kentucky, North Carolina, Florida, and Wisconsier, from which there were no returns	70,000,000
Bushels	658,426,741

The total number of sheep in the different states is estimated at 17,114,881, and of cattle 12,300,000.

The following is an estimate of the value of property in the United States:—

	DOLLARS.
Value	3,700,000,000
Debt	215,000,000
Annual interest	11,060,000

From the known fact that all the property (out of the city of New York) assessed by the state assessors, is invariably valued at 20 per cent. under par, we may safely estimate the value of property in the United States at 4,000,000,000 dol.

The exports of the United States in 1840 were 131,571,950 dol.; the imports 104,805,891 dol.

The following is believed to be a pretty correct estimate of the agricultural and manufacturing produce of the United States, in 1839—the year to which the census of crops, &c., must apply:—

	DOLLARS.
Cotton	81,000,000
Tobacco	15,000,000
Rice	4,500,000
Breadstuffs	275,000,000
Manufactures	300,000,000
Other articles	50,000,000
Total	725,500,000

MASSACHUSETTS MANUFACTURES.

The chief manufacturing state is Massachusetts, in which the number of cotton manufactories is 268; number of spindles, 665,709; value of manufactured articles, 16,578,003 dol.; number of persons employed, 20,929; capital invested, 18,079,089 dol.; number of distilleries, 37; number of gallons produced, 4,108,042; number of breweries, 7; number of gallons produced, 429,800; of which Boston contains 2—number of gallons produced, 195,000; capital invested in breweries and distilleries, 963,100 dol.; of which is invested in Boston, 820,000 dol. Total capital invested in manufactures in the state, 42,492,286 dol.

COMMERCE AND CAPITAL OF NEW YORK.

The chief commercial state is New York. The total number of commercial houses in the State of New York, engaged in foreign trade, is 459, of which 417 are in the city. The total number of commission houses is 1,049, of which 918 are in the city. The capital invested in foreign trade in the Empire State is 48,808,401 dol. That invested in retail dry goods, grocery, and other stores, 41,481,551 dol. That invested in lumber yards, 2,195,077 dol. That invested in the business of victuallers, 2,889,216 dol.

PITTSBURG IRON AND OTHER MANUFACTURES.

Pittsburg, in Pennsylvania, is the chief seat of manufactures in iron and other metals. It has twenty-eight furnaces for cast-iron; number of tons produced, 6,584; value manufactured about 446,880 dol. Number of bloomeries, forges, and

rolling mills, for bar iron and nails, 12; number of tons produced, 45,100; value manufactured, about 4,500,000 dol.; number of hands employed, including miners, 2,305; amount of capital invested, 1,931,000 dol. Glass department.—Number of glass houses, 16; cutting establishments, 9; men employed, 515; value of manufactured articles, including looking glasses, 520,000 dol.; amount of capital invested, 580,000 dol. Hardware and cutlery department.—Value of hardware and cutlery manufactured, 351,500 dol.; number of men employed, 210; small arms made, 1,350; men employed, 13. Precious metals.—Value manufactured, 4,860 dol.; men employed, 6.

	DOLLARS.
Total amount of capital invested in manufactories (iron not included)	3,917,472
Iron department	1,931,000
Total capital in manufactories......	5,848,472

RAILROADS AND CANALS.

There are 3,319 miles of railroad in use in the United States, constructed at a cost of 86,000,000, and greatly facilitating travelling and transportation; 1,802 miles more are in progress of completion; and the whole number of miles projected, including finished, unfinished, and routes examined, is nearly 10,000. There are also 3,910 miles of canals, of which 3,450 miles of artificial (canal or slack water) navigation are completed.

SCIENTIFIC MEMORANDA AND NOTES ON ART.

Polytechnic Institution.—There is now fitting up at this institution, under the superintendance of Mr. Bain, an exhibition of the electrical clocks of his invention, in which the method of putting sixty clocks in action by one galvanic battery will be shown. One of these clocks, with an illuminated dial, is about to be placed in front of the institution, by which the principle of the invention, patented by Messrs. Barwise and Bain, will be seen in practical operation.

At the Royal Dublin Society's exhibition of Irish manufacture, a model of an improvement on the hour glass, invented by Christopher M'Dermott, of Irishtown, was shown. The sand, in place of passing silently away, strikes a bell upon its exit, which intimates that the period for which the glass was timed has expired, and gives notice to turn it. The sand, as it runs, divides its time on a dial affixed to the instrument, so that if the glass be timed for an hour, the minutes will be marked on the dial as the sand passes. Whether this improved sand glass be required at lecture or music practice, bakehouse or on shipboard, its extreme usefulness will be apparent; and, if introduced into the drawing-room or study, it will be found both ornamental and useful.

Measurement of Time by Shadows.—The people of the East measure time by the length of their shadow. Hence, if you ask a man what o'clock it is, he immediately goes into the sun, stands erect, then, looking where his shadow terminates, he measures his length with his feet, and tells you nearly the time. Thus the workmen earnestly desire *the* shadow which indicates the time for leaving their work. A person wishing to leave his toil, says, "How long my shadow is coming!" "Why did you not come sooner?"—"Because I waited for my shadow." In the 7th chapter of Job we find it written, "As a servant earnestly desireth his shadow."—*Roberts's Illustrations,*

Microscopic Steam-engine.—We lately noticed a lilliputian steam-engine, the manufacture of an ingenious young man who endeavored to show in how small a compass the machinery of a steam-engine, with all its working parts, could be comprised. The same individual, a watchmaker, stimulated by the notice which his first effort excited, has produced another working model of a steam-engine of still smaller dimensions. The weight of this new working model, including engine, boiler, safety-valves, fly-wheel, stopcocks, feedpipes, and all the other et ceteras, does not exceed three pennyweights. The cylinder is less than the sixteenth of an inch in diameter, and it has been calculated that the fly-wheel makes upwards of 500 revolutions in a minute. It is to be seen in operation at the shop of the skilful workman, opposite the Eastern Institution, Commercial-road East.

Manufacture of Platinum.—A correspondent suggests that the price of that necessary article, platinum, might be materially reduced by means of the electrotype process. There is no doubt that the high price of this metal is, in a great measure, due to the labor required in its reduction into a malleable state, by the method of Wollaston; and this portion of the expense (our correspondent is of opinion) might be considerably reduced, if the metal were at once reduced from its solution by the slow action of electricity—this mode involving no labor, while the necessary apparatus is cheap. The same method, it is further suggested, could also be applied to reduce nickle to a malleable state; and this being a cheap metal, and not liable to rust, it might be advantageously used for some purposes for which platinum is considered too expensive.

We learn that some paintings in a new style of art have been recently produced, which, uniting the chief characteristics of painting and sculpture, produce a vivid reality of effect equally surprising and pleasing. It might be designated by the term *Ectemnography,* or described as relievo painting. It is shortly, we believe, to become the subject of an exhibition.

Potato Culture.—In earthing up potatoes the soil should encroach as little as possible on the foliage when the latter is in a young state; but as the young stems advance in growth and more foliage is produced, the loss of the few lower leaves that may be smothered by a full earthing up will not prove injurious,—they, in fact, are the first that suffer natural decay.—Earthing up is in all cases advantageous; but more especially so as regards the large varieties. The sides of the ridges should be convex rather than concave or straight, because the latter forms afford but little at top in which tubers can form.

Targioni Tozzetti on the presence of iron in Oscillatoriæ in the thermal springs of Rapolano, although no iron exists in the water.—M. Libri presented to the Academy a memoir in which the author above quoted observes the fact mentioned, although no iron is to be found in the water itself—he therefore cannot conceive from whence these plants obtain it. The iron contained in these *Oscillatoriæ* accumulates by degrees in the cavities where water is contained, as in the stony pits which are formed, and thus its presence can be sought after, and proved by chemical analysis. This remarkable observation opens much the field of inquiry of late promulgated respecting the influence possessed by exceedingly minute organised bodies accomplishing the production of certain minerals.—*Microscopic Journal, No.* 3.

Caterpillar Weavers.—A number of years ago, M. Habenstreet, of Munich, an old officer, amused himself by directing the labor of caterpillars, and succeeded in producing an entirely new and curious kind of fabric. These caterpillars are the larvæ of a butterfly known by the name of finea punctata, or, according to other naturalists, finea padilla. Their instinct leads them to construct above themselves a covering of extreme fineness, but, nevertheless, firm enough to be impenetrable by air, which covering can be easily detached from them. The inventor made these insects work on a suspended paper model, to which he gave exactly the form and size which he required. He thus obtained, at pleasure, among other articles, square shawls, of the dimensions of an ell; shawls two ells in length and one in width; an aerostatic balloon, four feet high by two in horizontal diameter; a lady's entire dress, with sleeves, but without seam. When he wished to give to the fabric any prescribed shape, all that he found necessary was to touch the limits which ought not to be passed with oil, for which the caterpillars have a natural repugnance so strong that they will not come in contact with it. The fabric, although perfectly consistent, surpassed the finest cambric in lightness. The balloon which we have mentioned weighed less than five grains. The warmth of the hand was sufficient instantly to inflate it; and the flame of a single match, held under it for a few seconds, was enough to raise it for a considerable height, whence it would not descend for half an hour. When a shawl of the size of a square ell had been well stretched, it was blown into the air by means of a small pair of bellows, and then resembled a light smoke, subject to the slightest agitation of the atmosphere.—*Boston Mercantile Journal.*

The Breed of Salmon.—For some years, Sir Francis Mackenzie, of Gairloch, Baronet, has been anxious to prevent that total destruction of the salmon race which has been so threatening, and which, in many cases, has actually been accomplished; but it is only this season that he has discovered a satisfactory remedy for this evil, and proved that the salmon can be propagated to any extent artificially, and protected from the natural enemies of their youth, as easily, and at a smaller expense, than is required for raising a head of pheasants or other game. Sir Francis has at this moment a large school of young salmon fry, hatched during spring, in a pool prepared for the purpose, and ready, at the proper age, to inhabit their native river, the Ewe, from which the parent fish were taken. They are now one-and-a-half to two inches long, and decidedly par—thus confirming what has so often been asserted, and on a small scale proved, by Mr. Shaw, of Drumlanrig, to whom belongs the credit of first suggesting a way of propagating our royal fish, though the possibility of doing it, to any extent that could really prove valuable, was always denied. Sir Francis Mackenzie has, however, by perseverance and zeal in the cause, overcome the difficulty, and it is hoped will soon make known to the public the details of his interesting and valuable discovery.—*Inverness Courier.*

White Incrustation on Stones in the River Annan.—During a short stay which Dr. Lancaster made last summer on the banks of the Annan, in Dumfrieshire, his attention was arrested by the appearance of the stones on the banks of the river. Wherever a mass of gravel was exposed to the air, the surface of the stones appeared covered with a white incrustation, as if they had been white-washed. This appearance was more or less general on all the exposed banks, but was most evident on the stones nearest the water's edge. On examining the stones with a pocket lens, their surface appeared covered with acicular crystals, and from this it was at first concluded that the incrustation arose from the crystallisation of some salt abounding in the water. On procuring, however, some stones from the water itself, they presented on their surfaces the filaments of a minute *conferva,* which appeared to be the source of the white crust; but as the existence of the conferva would not explain the crystalline appearance, it was examined under the microscope, and the appearance was found to proceed from minute acicular bodies about 1-100th of an inch long, and 1-2,000th of an inch broad, which were most of them arranged in a stellated form, but many were scattered in all directions; they are described by Ehrenberg under the head of Polygastric Animalcules of the family *Baccillaria,* and belong to the genus *Synedra.* Running under the whole were the filaments of a minute conferva, on which the acicular bodies rested.—*Microscopic Journal, No.* 3.

Several objects of antiquity have been recently discovered at Vienne, in the Isére, including marble capitals, a fragment of a female figure believed to be Latona, a bas-relief with fragments of horses, and part of a mosaic pavement.

VARIETIES.

Launch of the Trafalgar.—We were present at the launch of the 120 gun-ship *Trafalgar,* at Woolwich, on Monday last, which took place under circumstances highly appropriate to an event in which our national feeling and national glory are so deeply interested. The presence of the Queen, of Prince Albert, and of several members of the Royal family, gave an importance to the occasion of greater than usual magnitude. The Dock-yard had been fitted up with ornamented booths, in all points commanding a view of the ship, and the innumerable vessels of all descriptions which crowded the river were decorated with colors, and in some their yards were manned. The animated scene on land and on water, as viewed from the quarter-deck of the Trafalgar, was extremely inspiriting, and was calculated to rouse the feeling of national pride in every British heart. At half past two o'clock the last block which held the immense structure was knocked away, and the ship glided gradually on the stocks with a slowly accelerated motion untill she entered the water, and floated buoyantly on the element whereon she is to carry the proud flag of England triumphant. The water displaced did not cause nearly so great a swell in the river as we anticipated. The velocity of the ship's motion was not at any time great, as the resistance of the water checked the accelerating impulse. When afloat, the immense size of the *Trafalgar* was shown to great advantage in contrast with the steam-boats and other vessels, above which she towered. The arrangements for the launch were made by Captain Hornby, the Superintendent of the Dock-yard, with great care; and we did not hear of a single accident. The caution to prevent crowding in the booths by an over-issue of tickets, was, indeed, carried to excess, as many more might have been accommodated.

Launches in Prospect.—The following ships of war will be launched this summer, in addition to the Trafalgar, first-rate:—Hindostan, 80, at Plymouth, the 2d of August; Collingwood, 80, at Pembroke, the 17th of August; Cambriam, 36, at Pembroke, the 3d of July; and Growler, steam-vessel, at Chatham, first week in August.—*Naval and Military Gazette.*

Population of Liverpool.—The population of the parish of Liverpool, according to the late census, is 222,954; the population in 1831 was 165,175; increase in ten years 57,779, or nearly 33 per cent. The population of the Parliamentary borough will exceed 330,000, and may reach 350,000, especially if we include part of the population of the places connected with Liverpool on the Cheshire side of the Mersey.

Census of Sheffield.—The following will show pretty accurately the state of the township of Sheffield in 1831 and 1841:—

	In 1831.	In 1841.
Uninhabited Houses	652	2,250
Houses building	266	84
Population	59,011	67,902
Ditto Attercliffe township . .	3,741	4,161

Extraordinary Meteor.—Between 12 and 1 o'clock on Saturday night, an alarm was given that Eastcourt Mansion at Charlton Kings was on fire, a great light being observed on the roof of the house, and on the trees and hills to some distance. In the course of a few minutes the light decreased and presented to the eyes of the spectators the figure of a man with his arms extended. The figure appeared to turn round, dwindled to a beautiful star, and then entirely disappeared!—*Cheltenham Free Press.*

An Egg within an Egg.—In a hen's egg of the ordinary size, from the farm of Banks, in the parish of Mousewald, there was found another perfectly formed egg, about the size of a pigeon's, both of which had yolks, and were perfectly complete in all respects, the shell of the enclosed egg being even firmer and stronger than usual.—*Dumfries Herald.*

Proposed Suspension Bridges in the Regent's Park.—Amongst the measures contemplated for making the interior of the Regent's Park accessible to the public on all sides, a plan has been devised for crossing what is termed "The ornamental water," opposite Hanover Gate, by means of two suspension bridges, to be executed on a small scale, and upon a principle originally suggested by Dr. Dredge, of Bath, which is stated to combine, with great economy of material and expense, all the lightness and strength desirable in such a structure.

Explosion of Fire-Damp.—On Wednesday morning an explosion of fire-damp took place at the colliery called Darley-Main, near Barnsley, belonging to Messrs. Traviss and Horsfall, by which two young men lost their lives.—*Leeds Intelligencer.*

Riot amongst Railway Laborers.—We regret to learn that some rather serious riots have taken place amongst the laborers employed upon the Manchester and Sheffield Rail

way in the neighbourhood of Hyde; the English laborers having endeavored to drive away the Irish, whom they allege to be working at lower wages than themselves. Hitherto, we believe, the attempt has not been successful, but a repetition of the riots was expected.—*Manchester Guardian.*

Cost of Production in England.—The truth is, that we manufacture all descriptions of goods at a less specific cost, that is, of an equal quality with a less quantity of labor in a given time, than in any part of the world, in consequence of the peculiar advantages we possess here. These consist of a cheaper fuel; our cheaper materials for machinery, and greater skill in making it and in using it when made; and, from the great extent of our trade, the benefit of making the greatest possible quantity of goods from the same cost of buildings, machinery, and pattern blocks. Add to these, the peculiar situation in which we are placed, with our harbours open for intercourse with all parts of the globe during the whole year; while, upon a great part of the continent, their rivers are generally closed for two or three months, and some of them longer; and, for the like period, the water power which they in part employ for their machinery also frozen up, and a stop put to all labor. Then there are our good roads, canals, and railways, for easy and rapid transport to all parts of the nation, at little cost. And further, there are here a greater number of banking establishments, affording means for the more ready sale of our products; and with a greater division of labor, more arduous labor given by our workmen, in order that they may obtain little comforts and conveniences which they have learnt to enjoy, and which are not known by the same class upon the continent.—*Renney's Reflections on the Corn Laws, just published.*

The Spitalfields' Silk Picture.—This picture, when completed, will be, perhaps, the most extraordinary production of the art of weaving ever accomplished. It is to be presented to her Majesty. The design is a work of great merit. The designer is a young, and, it is believed, self-taught English artist, of the name of Voyers, who is principally employed in making patterns for paper-hangers and calico-printers. The object that the Spitalfields Broad Silk Weavers' Association have in view is, to show the world that our weavers are equal, if not superior, to those of Lyons, who have lately produced a very masterly specimen of their art. Mr. Voyer's drawing is in Indian ink, and the picture, when completed, will be in a self color, resembling a mezzotinto engraving. The design is what is called aerial. The foreground, (if there can be a ground to an aerial picture) is occupied by Mars and Neptune, with two bee-hives in the centre. On the side of Mars there are medallions of Wellington, Abercrombie, Moore, Wolfe, &c.; on that of Neptune, Nelson, Collingwood, Jervis, Howe, &c.; all of which are good likenesses. In the middle distance there is a portrait of the Queen sitting; by her side stands the Prince Albert, one hand resting on a marble slab, the other holding a sword. On the left of this group is a figure of Time, with his scythe, but between him and the Royal pair a guardian angel intervenes. In the centre a dove is seen descending upon the Queen and her consort. In the extreme distance Windsor Castle is seen, or rather indicated, on the sides of which are groups of aerial beings, intended to represent Honor and Harmony. The picture is cut off from the border by lines. The border itself is a brocade in the gorgeous style and colors of Louis XIV. It consists principally of foliage, interspersed with bouquets of flowers in all colors. In the centre of one side are seen the Royal Arms of England, and on the other the insignia of the Order of the Garter. The picture will be 16 feet long. The expense in manufacturing this wonderful production of the loom will amount to soms thousand pounds.

Consumption of Sugar in England.—Forty years ago, when the wealth of the country was far less than it now is, every man, woman, and child in the United Kingdom consumed, on the average, 22½ lbs. of sugar in the year. There are no means of finding out with accuracy the consumption of the various ranks into which society is divided; but that this rate of consumption is not considered to be lavish for any—even the humblest class in the community—may fairly be inferred from the dietaries now in use in various workhouses in England, where the aged paupers are allowed seven ounces of sugar per week, or at the rate of 22¾ lbs. per annum. If this quantity is thought no more than is reasonable for the inmates of a workhouse, we may be pretty certain that it is greatly below the rate of consumption among the easy classes. We have been at some pains to ascertain the yearly consumption of sugar per head among persons in the middle rank of life, to whom the cost is not a matter of much importance, and who do not vary their mode of living with every change in the market-price of provisions. In such families, the yearly consumption is 37 lbs. for each individual, or 1⅝ ounces *per diem.* In many families, the consumption is far greater than this; but if we suppose that one-fourth of the people of England use this moderate quantity, the average consumption in 1801, of the remaining three-fourths, must have been 17 2-3 lbs. Last year, the average consumption per head throughout the kingdom was 15¼ lbs. Assuming that one-fourth of the people used 37 lbs., the average yearly consumption of the remaining three fourths was 8 lbs. per head, or just one-third of the allowance given to paupers, and not one half the quantity used by the working classes in 1801. That the consumption here stated, of 37 lbs. per annum, is not an excessive estimate, is shown by the further fact that every person serving in her Majesty's ships receives for daily use 1½ ounce of sugar,—being at the rate of 34 lbs. 3 oz. per annum. At this same rate, the consumption of the kingdom would be more than 120 per cent. greater than it actually was in 1840.—*The Many Sacrificed to the Few.*

German Universities.—The *Journal des Debats*, under date Halle, the 9th inst., states that a considerable diminution had taken place in the number of students frequenting the German Universities. In the year 1830 they amounted to 14,000. In the year 1839 the number diminished to 11,000.

A considerable sum has just been raised in several towns in Germany for the purpose of defraying the expenses of removing the remains of Weber, the distinguished German composer, from the Roman Catholic Chapel in Moorfields to Dresden. It is also contemplated to erect a monument, in every way suitable to the memory of so great a musician, so soon as funds are raised sufficient for this commendable object.

A COMPANY for ESTABLISHING RAILWAYS in IRELAND, under the Guarantee of the Counties, and under the Superintendence of a Board of Control nominated by Government.

PROSPECTUS.

The construction of a general and comprehensive System of Railways in Ireland has of late years been universally regarded as a measure of vast importance to that portion of the Empire, and as calculated to produce, by the employment of the population, and the creation of an extensive, expeditious and economical mode of conveyance, the greatest benefits to that country.

As a commencement of the system, it is proposed, with the approbation of Government, but subject to the sanction of Parliament, to make the Southern line in the direction indicated by the Report of the Railway Commissioners, and proposed by the Government in 1839, to Limerick, by way of Holy Cross.

The works to be executed by Commissioners to be named by Parliament in the Bill.

A Board of Control to be constituted by Government to superintend and control the proceedings of the Commissioners.

For this purpose a capital of £1,300,000 is to be raised, under the direction of the Committee, on the part of the subscribers.

The capital to be raised in shares, or sums, of £1,000, £500, £200, and £100 each, on debentures, to be signed after the passing of the proposed Act of Parliament, by two of the Committee, and to be countersigned by two of the Board of Control. A deposit of £10 per cent. to be paid on the subscriptions being allotted; the remaining £90 per cent. to be paid in nine instalments of £10 each, on the 15th January, the 15th April, the 15th July, and the 15th October, 1842; and the 15th January, the 15th April, the 15th July, and the 15th October, 1843; and on the 15th January, 1844. On non-payment of any instalment, the previous instalments to be forfeited.

The Debentures to bear interest at 4 per cent. per annum, such interest to be guaranteed by Act of Parliament by a charge on the counties to be benefited by the measure, in such proportions as shall be settled by the Commissioners, and approved by the Board of Control.

The Debentures may be, after payment of all the instalments, converted, at the option of the holders, into stock.

The Debenture and Stockholders to form a Corporation, and to be represented by a Board of Directors, and the Committee to form the first Board.

In addition to the interest of 4 per cent. per annum the Debenture and Stockholders to be entitled to half the surplus profits after payment of interest and all outgoings.

The other half of the surplus profits to be appropriated, from time to time, for the benefit of the counties guaranteeing the interest, in proportion to their liability to the interest.

The Commissioners to have the direction and execution of the works; the regulation of the Tolls within limits to be fixed by the Act; and the entire management of, and arrangements on, the lines, when formed; subject to the control of the Board of Control; and to remit the interest, and half the surplus profits, half-yearly, to the Directors.

The Act to contain powers to enable the Commissioners to vary or modify the proposed line, with consent of the Directors, and subject to the approval of the Board of Control.

This plan having been based on the estimates of the Railway Commissioners, provision is to be made, in the event of the estimates being exceeded, and any additional capital being required, to secure the same interest and profits to the Company as they would have had on their original capital, had no such additional capital been required.

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Nominated by Government.

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38 Geo. III., c. 71.

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7 Geo. III., c., 38; 17 Geo. III., c. 57.

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